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WEEDS TREES & TURF

The Magazine of Landscape and Golf Course Management Since 1962

Turf Disease Control Guide

Spring patch diseases

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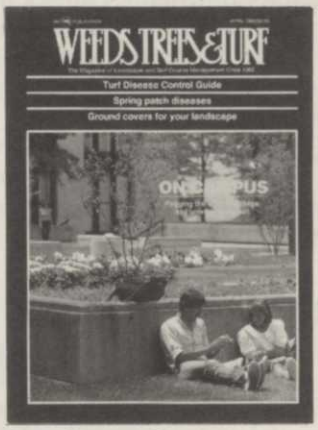

Case Western Reserve University, Cleveland, Ohio.

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NEWS/TRENDS by the Editorial Staff

Jerry Roche

Ken Kuhajda

Heide Aungst

Your turf can survive with limited water

■ Dr. Jim Beard, turfgrass professor in the Dept. of Soil and Crop Sciences at Texas A&M University, says he's been getting more and more phone calls from golf course superintendents in sunbelt areas who are faced with more stringent water restrictions. What should supers do to keep their turf healthy while water becomes more scarce?

Dr. Beard, speaking at the recent GCSAA convention in San Francisco, suggests several actions: enhance root growth; cultivate to enhance water penetration; control thatch levels; lower the nitrogen levels; raise potassium levels; and minimize the use of herbicides (which can hurt roots). Three factors Dr. Beard said reduce drought hardiness are high nitrogen levels, low potassium levels, and iron deficiencies.

Dr. Beard maintains that large water users, such as golf courses, will have to appear before a local water control board to argue for allotment of water. That's already common in some areas.

Water woes touch all in green industry

■ Morever, it's not just the golf course sector of the green industry that is affected. Dr. Beard says landscape firms and other large green industry water users should seek new conservation solutions because there will be a water shortage in this country. And that day is not far off, he said in the September, 1985, issue of the *Landscape Contractor*.There's plenty of water in the U.S., but as more people move off the farms (where water is generally plentiful), we need to find a way of getting the water from the country to the city, where many housing allotments are rising. That's not always an easy task.

Dr. Beard recommends that water managers keep records of water use. He says users who can document their requirements will have a better chance of receiving adequate supplies if allotment is based on past consumption.

Phoenix gets Colorado River water

■ Late last year, Phoenix, Ariz., got its first taste of Colorado River water it was promised by the U.S. Congress in 1979. The successful partial completion of the Central Arizona Project (CAP) has allowed water to be pumped from Lake Havasu eastward and uphill—more than 200 miles—to Arizona's capital city.

The joint federal/state cost-sharing project is not yet finished. Work is continuing on another goal: extension of Colorado River water to Tucson, some 110 miles to the southeast of Phoenix, by 1991. As the project progresses, the state will assume more responsibility for CAP. When completed, CAP will provide 60 percent of Arizona's renewable water supply.

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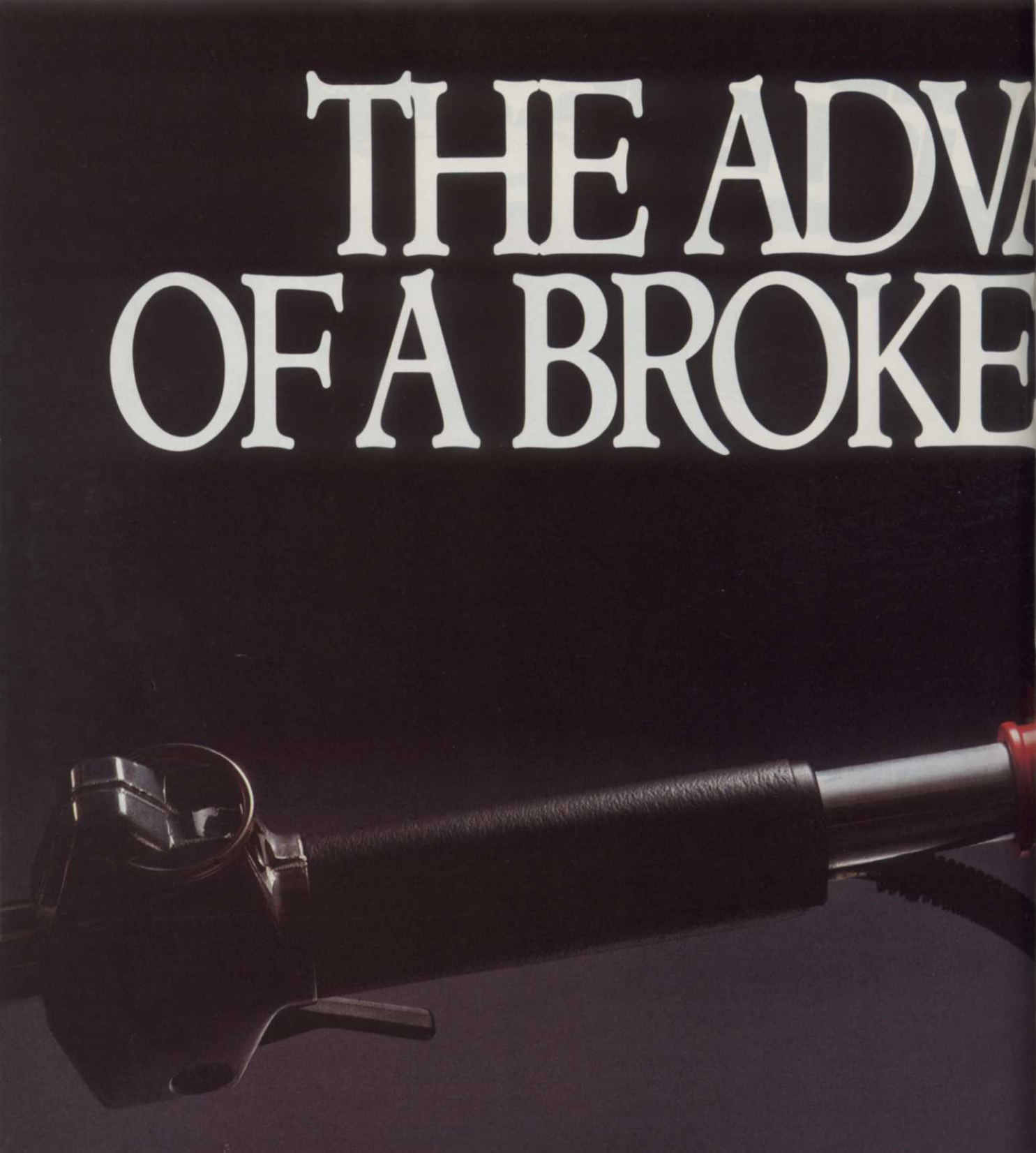

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TORO

HAVEN'T YOU DONE WITHOUT A TORO LONG ENOUGH?

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ASSOCIATIONS

GCSAA show draws record crowd of 10,912

If there's a legend you've always wanted to meet in the green industry, you probably did at this year's GCSAA conference and trade show held Jan. 27 through Feb. 4 in San Francisco.

Well-knowns from all areas of the green industry descended on the Bay City for the 57th annual show. The GCSAA says a record 10,912 attended.

Test pilot Gen. Chuck Yeager, speaking to the nation's golf course superintendents just days after the Challenger space shuttle tragedy, observed that "when we fool with high technology, we have losses."

On a happier note, Dr. James Watson, The Toro Company vice-president, was named WT&T's Man of the Year for 1986. The Louisiana native has been with the company for 33 years.

Other luminaries at the show included LPGA Hall of Famer Patty Berg and entertainer Dinah Shore, who presented Berg with the "Old Tom Morris" award.

Del Cooper (left) of Tory Pines Resort, Francestown, N.H., engages in friendly conversation with Bob Brown of Jacobsen Div. of Textron on the GCSAA trade show floor in San Francisco.

Dr. James Watson... WT&T's Man-of-the-Year.

Attendance wasn't the only record broken at the show. Seventy-two new exhibitors numbered among the record 317 total. That meant a trade show which topped 107,000 sq. ft. in exhibit and display area. Some advice: give yourself at least a day next year to visit all booths. You'll need it.

GCSAA sales and marketing manager Tuula Wright says the association was "very pleased" with the turnout. "It was a very beneficial show," Wright tells WT&T. "I was pleasantly surprised at the number of new products introduced at the show."

Wright says some smaller companies took more sales orders in three days than they do in an average year.

Unfortunately, the GCSAA may have to turn down exhibitors next year. The show will be held at the Phoenix Civic Plaza which has a total of 110,000 sq. ft. of floor space. When you take into consideration walking area, that's about 5,000 sq. ft. less than the Moscone Center. Wright says she will be flying to Phoenix to see if there's a possibility of gaining space by adding another room.

Some of the educational session speakers at the show included doctors Richard Smiley, William Meyer, C. Reed Funk, Paul Rieke, James Beard, and a host of industry people and superintendents.

An interesting addition to this year's GCSAA conference was the simultaneous Sports Turf Managers Conference held Feb. 1.

The STMA is also planning its 1987 conference to be held in conjunction with the GCSAA show.

ACADEMIA

Rutgers students get Lofts' awards

Rutgers University students Jennifer Johnson-Cicalese and David Dugan recently received the Peter Selmer Loft Memorial Scholarship Awards from Lofts Inc. president Jon Loft.

Both are graduate students in turfgrass science.

The award is named after the late Peter Loft of Lofts Inc., who was active in the turfgrass industry. This is the second year the awards have been given.

ASSOCIATIONS

Mid-Year show is cancelled

The Golf Course Superintendents Association of America is doing away with its mid-year turfgrass trade show which debuted just last year.

Executive director John Schilling says the seminar portion and benefit golf tournament may still be held. The GCSAA will make its final decision at its board of directors meeting in May. If the board gives the go-ahead, the seminars would be held in the fall, without the trade show.

"The trade show was promoted well, but attendance dropped off the second day," Schilling says. "We felt a one-day trade show was asking too much of our exhibitors."

Schilling says another factor which contributed to the decision is the volume of state and regional shows held around the same time, particularly in the East. "They're serving regional areas," Schilling says. "There's no market out there."

The golf tournament brought in about $7,000 for turfgrass research last year. Schilling says the interest and the need for research funds is too strong to drop the idea completely.

"It takes a lot of money to be able to study the grasses available which use less chemicals and water," Schilling says. "And, by playing the tournament in the fall, we can be on northern courses, which gives us exposure there."

TREES

Arborists care for Ellis Island trees

Last November, more than 100 tree service personnel worked to preserve trees on Liberty and Ellis islands.

The National Arborist Association, under the direction of Robert Kirwin and staff from American Tree Care, Inc. on Long Island, organized the event. Represented were 23 NAA firms from New York, New Jersey and Connecticut, along with 20 arboriculture students from the University of Massachusetts.

The group pruned several hundred trees, providing a donation in excess of $30,000.

"Never have so many climbers been assembled in one location before," says NAA executive vice-president Bob Felix. "It's a thrill to be involved in this historic scene and to see so much tree care talent donating their services."

An arborist prunes while Miss Liberty looks on.

TREES

Canadian college spares life of giant tree

Olds College in Alberta, Canada practices what it teaches. When a new driveway was planned on campus, the staff decided to save a 40-foot mountain ash instead of chopping it down.

"It's important to me to see the tree replanted," says grounds supervisor Dennis McKernan. "After all, we teach growing here at Olds College, and here was a golden opportunity to demonstrate one aspect of that."

Moving such a large tree involves risk and preparation. Before the move, the tree was pruned back and sprayed to reduce moisture loss. Its root system was boxed up with plywood and a steel framework was welded into place.

It took a 30-ton crane to hoist the boxed tree onto a trailer. The tree weighed more than 12 tons. Two power lines and one telephone line had to be dropped to let the towering tree pass by. The tree was then lifted off the truck and put into the ground without any problems.

The tree is doing fine.

Left to right, Paul Mengle, manager professional turf and garden sales; Kendall Tomlinson, vice president and chief operating officer; Vernon Bishop, president and chief executive officer; and Jim Kuhle, plant production manager.

TURF

Lebanon's new turf production warehouse to open next month

Lebanon Chemical Corp. is building a new warehouse for turf products.

The facility, located in Lebanon, Pa., will have more than 52,000 sq. ft. of space. It will be able to store about 5,000 pallets.

The new warehouse will complement Lebanon's existing four warehouses which offer 234,000 sq. ft. of combined storage space for more than 22,000 pallets of finished goods.

"This additional storage capacity will allow Lebanon to fully service turf professionals during peak seasonal demands without sacrificing our production standards," says Lebanon president Vernon Bishop.

The warehouse is scheduled to open in May.

PBI/Gordon acquires Bulkkem Corporation

The PBI/Gordon Corp. has acquired the Bulkken Corp.

Skip Skaptason, PBI/Gordon group vice-president, says the acquisition will strengthen the company's market distribution.

Bulkkem's basic operational procedures will be unchanged.

"Bulkkem is not as strong as a stand-alone company as it is integrated into our group," Skaptason tells WEEDS TREES & TURF. "The acquisition will provide additional muscle in the marketing area."

Skaptason says that the increased visibility will also mean increased availability of local help for lawn care operators. Additionally, LCOs can now receive same day delivery of many products, including several new products now available from PBI/Gordon.

"The combination of the acquisition of Bulkkem and the increased distribution organization makes it easier and more effective to introduce new products," Skaptason says.

Among the new products are Bov-A-Mura, a concentrate of dairy cattle slurry that turns problem thatch into humus; Pestroy, a PBI/Gordon formulation of sumithion, an insecticide used world-wide; and Transfilm, an anti-transpirant that protects plants against damaging conditions.

CHEMICALS

Glyphosate receives safe rating by FIFRA

The FIFRA Scientific Advisory Panel has reviewed glyphosate, used in Roundup and Rodeo herbicides, and found inadequate evidence of carcinogenicity.

The EPA had originally petitioned the panel to put glyphosate in the Class C (possible human carcinogen) category because of one controversial and suspect mouse study.

In those tests, mice of one sex of one species which were given maximum tolerated doses of glyphosate had a higher incidence of kidney tumors. But one panel member called the study's statistics "a pretty weak endpoint" and "open to question."

A large part of the panel's Feb. 11th meeting was devoted to the pesticide. Robert Harness of Monsanto, which manufactures Roundup and Rodeo, called for a Class E, "no evidence of carcinogenicity," classification.

LEGISLATION

EPA issues booklet on hazardous waste

The EPA has issued a publication called "This brochure will help you comply with hazardous waste laws."

The brochure contains a special insert describing hazardous wastes, along with chapters defining the new RCRA law, who is regulated, how to prepare and ship hazardous wastes, and how to manage wastes on-site.

The EPA estimates that 175,000 small businesses will be affected by the new RCRA law. (See Sept., 1985 WT&T).

For more information on how the new law might affect your business, call the EPA's Small Business Hotline, 800-368-5888 or the EPA's RCRA Hotline, 800-424-9346. You can also pick up information through your state hazardous waste management agency or your EPA regional office.

PESTICIDES

Ornithologists: DDT ban brings back birds

The bald eagle and four other rare birds have made a dramatic comeback since the reduction of DDT and other persistent pesticides in the environment, according to ornithologists at Cornell University.

The group says the North American birds of prey have increased in population in the last four years. Besides the bald eagle, other species including the prairie falcon, northern goshawk, merlin, and gyrfalcon, have increased in population.

Populations dropped when large amounts of DDT were present in the environment in the early 1970s. The chemical impaired the birds' reproductive capabilities. Most uses of DDT were banned in the United States in 1972.

A decade ago, bald eagles were cited in only 39 states. Scientists say their number has increased by 92 percent and can be found in every state except Hawaii.

LAWN CARE

PLCAA creates new technical services post

The Professional Lawn Care Association of America is looking for someone to fill the newly created position of director of technical services.

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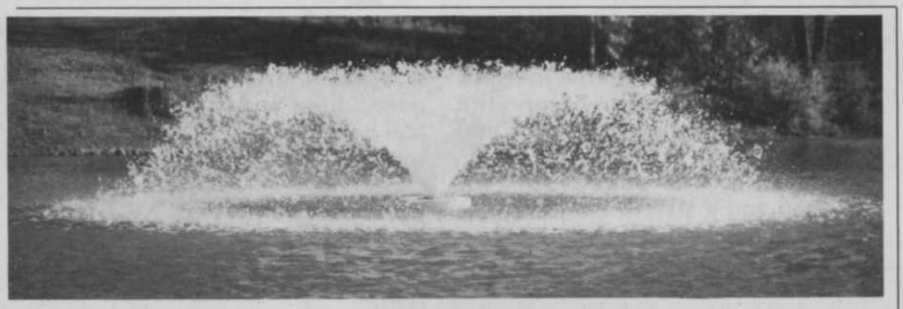

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Scotts ProTurf

Dick, ProTurf already has a 15-0-30 High K fertilizer for fairways. Why did you feel you needed something for greens? "On greens, you want a fertilizer with a very small particle size. Much smaller than our fairway product designed for the big rotary spreaders."

Why does particle size make a difference? "The smaller particles disperse evenly from the spreader, filter down into the turf, and disappear when you water. There's less chance they'll affect a putt or stick to shoes and get tracked around."

That sounds good for the golfers. "Superintendents will like it, too. In addition to being small, each particle is homogeneous. So, even at half the regular application rate, there's no chance of getting the kind of speckling you might see if you used a coarse blend. And more particles per square inch produces a more desirable, uniform greening response."

Now tell me why High K will be good for my greens. "High potassium levels have been found to enhance turf performance, particularly under stress conditions—improving drought hardiness, resistance to disease, and wear tolerance. There's also evidence that high potassium reduces winter kill in bermudagrass."

Why is there so little nitrogen? "To prevent over-stimulating top growth. For example, High K Greens can be used at double rates to build potassium levels in sand greens and you'd still be applying only 1 pound of N per 1,000 square feet. Or you can use it at regular rates on any greens that are on a low nitrogen diet. It can also be used at any time of the year."

Anything else we should know about ProTurf High K? "If you like what it does for fairways, you'll love what it does for greens."

For more information on new High K Greens Fertilizer, call your ProTurf® Tech Rep. Or call Scotts® direct at 800-543-0006. In Ohio, call collect 513-644-2900.

Circle No. 143 on Reader Inquiry Card

"We developed this new version of 15-0-30 High K fertilizer especially for greens. And golfers."

Dick Westfall, Scotts Research project leader (Fertilizer R&D), talks about new **High K Greens Fertilizer.**

SHORTCUTS

CADILLAC OF PUTTING GREENS.....PSU 126, a new improved bentgrass, will have been released to the golf course industry by the time you lay your eyes on this article. According to Dr. Joe Duich of Penn State University, the variety will be the Cadillac of golf putting greens.

"We started working on it 13 years ago," Duich says. "Our aim was to develop a better putting green of bentgrass with upright growth. I think we have an interesting product that will be well-received in the industry." The variety will be marketed by Tee-2-Green, Hubbard, Ore.

THE WEED CHART..... Barbara Betz, information specialist at Lesco Inc., tells WT&T that the demand for the Lesco Weed Chart was so great that the company had no choice but to print another one. A new, revised edition of the Weed Chart, complete with quality four-color photos, contains information on 44 grassy and broadleaf leaves commonly found in both the northern and southern U.S. The chart provides information about identification, growth habits and reproductions, and herbicide control. It's available for a reasonable $2. Write: Weed Chart, Lesco Inc., PO Box 16915, Rocky River, OH 44116.

SPEAKING OF LESCO..... We at WT&T are sad to lose an editorial advisory board member but we're happy for him. Bruce Augustin, turf specialist at the University of Florida in Ft. Lauderdale, has accepted a position as director of technical support with Lesco in Rocky River. He began work this month. A Michigan native, Augustin should be used to the winters he'll face on the shores of Lake Erie.

WILDFLOWER SOD?..... Gene P. Milstein, president of Applewood Seed Co. in Arvada, Colo., says wildflower sod will be a hot item in the future. Yes, you'll roll up the wildflower sod just like turf sod but Milstein says the wildflowers, which will be two-to-three inches high at the time of transport, won't be harmed. For Milstein's thoughts on wildflower sod, you can write him at 5380 Vivian St., Arvada, CO 80002.

'SKIN' WINS LAWN RANGER..... Tony Burnett, chief groundskeeper at R.F.K. Stadium in Washington D.C., home of the Washington Redskins, was named the "Lawn Ranger Award" winner by the Sports Turf Managers Association at their meeting held in conjunction with the GCSAA Show in San Francisco. The award is given annually to the groundskeeper of the year as judged by the ever-growing STMA.

ANDERSONS GO LIQUID..... The Andersons will introduce their first liquid fertilizer products this spring. Available through The Andersons distributors, the products are a 16-2-2 fertilizer, 30-0-0 low-burn nitrogen fertilizer, and a six percent liquid iron product, Lawn Pride, a chelated product.

The position includes responsibility for developing safety and technical education programs. The person would:

- work with state agencies on certification programs;
- establish a national certification program for PLCAA members;
- maintain a liaison relationship with university and industry scientists and associations such as the Public Issues Alert Committee; and
- represent the PLCAA at technical conferences and seminars.

"The growing public concern regarding environmental safety issues was a primary factor in deciding to establish the new position," says PLCAA executive vice-president Jim Brooks. "The association needs a staff person who can effectively work with the increasing number of technical issues facing the PLCAA and the industry."

According to Brooks, the ideal candidate for the position would have at least a master's degree in agronomy, field experience in the lawn care industry, communication skills, and management capabilities. Also, the new director of technical services must relocate to the Atlanta area.

Candidates must send a written resume no later than April 15, 1986 to: Search Committee, PLCAA, 1225 Johnson Ferry Rd. NE, Suite B-220, Marietta, GA, 30067. No telephone calls.

SPORTS TURF

New club launched at Cal Poly-Pomona

Fifteen of 21 members of Cal Poly-Pomona's new Sports Turf Managers Club were on hand at the recent Golf Course Superintendents Association of America trade show in San Francisco, including its president.

The club, which was formed last fall, sponsored a booth at the GCSAA trade show.

"We want it to be known in the turf industry that we would like to be involved," says president Nick Spardy. "We have tours, arrange speakers and get in a lot of practical work through the club. We want to apply all this toward our career."

Ken Williams is vice-president, Bruce Carleton secretary-treasurer, and Dr. Kent Kurtz advisor. Paul Magiera, agricultural council representative, was also at the trade show.

"We've gotten a lot of good feedback," Spardy says. "Everyone's really enthused, and if this works I'd expect to see such clubs at other colleges and universities."

RESEARCH

University builds turf research facility

The University of Maryland is updating its turf research facility in both the field and laboratory. Construction has begun for a new 38-acre Turfgrass Research and Education Facility in Silver Spring.

Dr. Peter Dernoeden says work should be completed in April on the office/equipment storage building and the pesticide/fertilizer storage building. An irrigation system will go in this summer.

"The facility really greatly enhances our field research capabilities," Dernoeden says.

One building will house a new computer system that Dr. Mark Welterlen will use to monitor environmental factors, such as temperature and moisture, on the growth of turf.

The Maryland Turfgrass Council and the Maryland Agricultural Experiment Station cooperated in purchasing the system, which cost $28,000. The Maryland Turfgrass Association, representing sod producers and installers in Maryland, also put $1,000 toward the system.

In addition to the field research facilities, the Maryland Turfgrass Council and the Maryland Agricultural Experiment Station also provided funds for the renovation of a turfgrass analytical laboratory located at the College Park campus.

PEOPLE

Leading architect passes away at 71

George W. Cobb, 71, one of the country's leading colf course designers for the past 30 years and a Fellow of the American Society of Golf Course Architects, died in Greenville, S.C. on Jan. 16. Among his other accomplishments, Cobb designed the first six golf courses on Hilton Head, S.C.

Dale Amstutz of Northern Lawns, Omaha, has been elected president of the Nebraska Professional Lawn Care Association. Vice-president is **John Skomal** of Custom Lawns, Omaha and secretary-treasurer is **Richard Penn** of Lawnco of Lincoln.

Russell J. Frith, president of Lawn Doctor, Matawan, N.J., has been named to the board of directors of the Professional Lawn Care Association of America. He is also chairman of the PLCAA's membership development committee.

Paul Bergman of Centra-Chemical Services, Hastings, has been elected president of the Nebraska Turfgrass Foundation. **Randy Nelson** of The Greenkeeper, Omaha, is vice-president and **John Hadwick** of Grand Island Municipal Golf Course is secretary-treasurer.

Allen Keesen Landscape, Denver, has promoted **John H. Gates, Eldon J. Dyk** and **Carl M. Nagel** to vice-presidencies. Gates will be responsible for Denver landscape construction and Dyk for the maintenance division.

Professional Golf Association Tour commissioner **Deane Beman** has been named 1986 winner of the Donald Ross Award by the American Society of Golf Course Architects.

John Gates

Eldon Dyk

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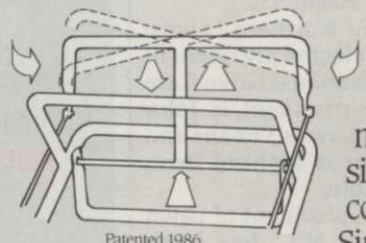

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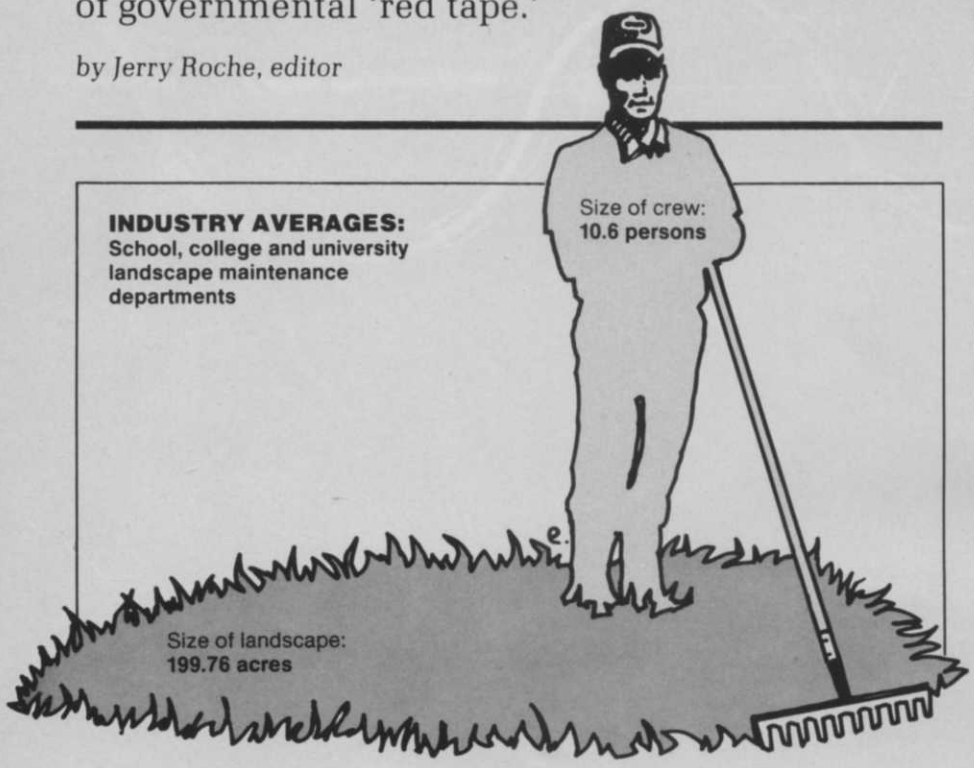
RED TAPE MANIA

Landscape superintendents at the nation's schools, colleges and universities are responsible for a wide range of services. For most, however, the worst part of the job is cutting through miles of governmental 'red tape.'

by Jerry Roche, editor



Imagine trying to create a beautiful landscape with both hands tied behind your back.

In many instances, landscape superintendents of schools, colleges and universities have to contend with this problem on a regular basis. The problem, you see, is filling out a pile of government forms to requisition a couple bucks for a new rake.

And many schools, colleges and universities are government-funded.

Although Gary Parrott of Michigan State University points to the many advantages of working in this sector, he also notes that "there's too much red tape" accompanying government funding. Larry Thompson of the University of Illinois at Chicago adds, "One disadvantage is not being able to hire those who you want for a specific position because of Civil Service rules. Another is having to bid for equipment, and then hoping you get what you want."

Susan Daniels of the University of Georgia agrees. "As a previous assistant manager of a nursery, I had a lot of adjustment coming into a state institution. They are a world apart from the regular business world.

"In the institution, it is considerably harder to reach goals, and very discouraging. But it's not impossible."

'We can all dream. That's what makes this job so challenging and interesting.'

Vandals a concern

An exclusive WEEDS TREES & TURF survey conducted earlier this year among landscape superintendents at schools, colleges and universities turned up some more interesting information. For instance:

- 78% of the respondents called vandalism "a concern" of their department;
- accordingly, nearly 45% of the respondents said that they have recently altered trimming/pruning practices in order to provide better campus security;
- most campuses (about 45%) are located in suburban settings;
- the average campus is almost exactly 200 acres;
- although 71% of the landscape managers get institutional discounts on equipment, just barely over half take discounts on chemicals; and
- 87% of the landscape managers buy all their equipment.

Running the gamut

The tasks landscape maintenance departments are asked to perform could well be the most diverse in the entire green industry. It is not unusual to find the same crews that maintain the landscape taking care of streets and roads, signs and holiday decorations. These are the same people who sweep parking lots, remove snow in the winter and handle trash and waste disposal.

"We do everything," claims Robert Karras Jr. of the University of Wisconsin at River Falls. "Every day is different. My crew is also the labor force to move offices, tables, etc., throughout campus. We also tackle new landscape projects."

Notes another superintendent: "One advantage to this job is that I have access to other departments in the physical plant such as carpentry, painting , welding and electrical. Another is access to students for part-time employees. A disadvantage is that the landscape department usually receives last consideration...but I have noticed an increased respect for the groundskeeper and an increase of support services."

There are other advantages to this type of work. Foremost, most campus managers can take discounts on equipment and chemicals. According to the survey, 71.3% get an average discount of 15.2% on equipment, and 50.3% get an average discount of 14.7% on chemicals. One

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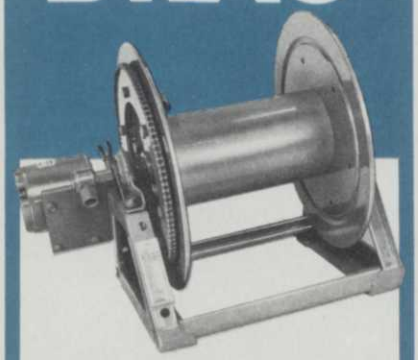

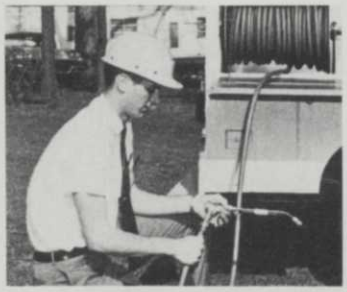

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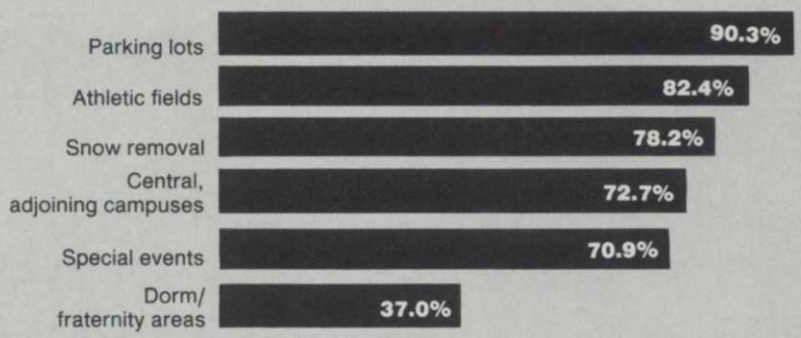

Other areas of responsibility mentioned: *offices, irrigation systems, nursery/arboretum/ botanical garden maintenance, research facilities, playgrounds, sign maintenance, interior plants, painting, streets and roads, Christmas decorations, hospitals, trash/waste disposal, some residences, sod farms, basic construction, lakes and ponds, wooded areas, ice maintenance in winter*

respondent noted discounts of up to 55% on both chemicals and equipment.

Of course, there is a flip side to this argument. Most necessities are put out to bid, and therefore what is actually bought is not always exactly what is needed for the job.

Nearly 45% of the respondents said they have recently altered trimming/ pruning practices in order to provide better campus security.

Recognition

Survey results also reveal an interesting trend toward more administrators recognizing the importance of a good-looking landscape.

"Outside appearance has been re-emphasized recently," said one respondent. "However, budget and manpower restrictions leave some requests being denied."

"I find that more emphasis is being placed on the landscape," said another. "What was good enough three years ago isn't today."

"Administrators *do* place heavy emphasis on the landscape," added a third manager. "The budget does not always cover all that they want, but they are fairly generous if they can see results."

One administrator responded to the survey. Here is what she wrote: "As in all cases, administrators—myself included—want the best possible landscape for the least cost. If it becomes apparent that I must have additional funding, I believe that I can obtain it with proper justification."

If budget restraints are a concern, the intelligent campus landscape manager will begin growing his own plants, as many already do. Nurseries and greenhouses have been found to be great dollar-savers.

Overall, responses to the WT&T survey were positive. Most school, college and university landscape managers like the campus atmosphere and the thoughtfulness of students and administrators in complimenting their departments.

One final respondent had this interesting observation, rather echoing the thought of many others:

"Perhaps with lottery money coming in this state, we can prepare a replacement budget. I'm almost sure some changes will be made, directing such funding to areas not currently approved.

"Well, we can all dream. That's what makes this job so challenging and interesting." **WT&T**

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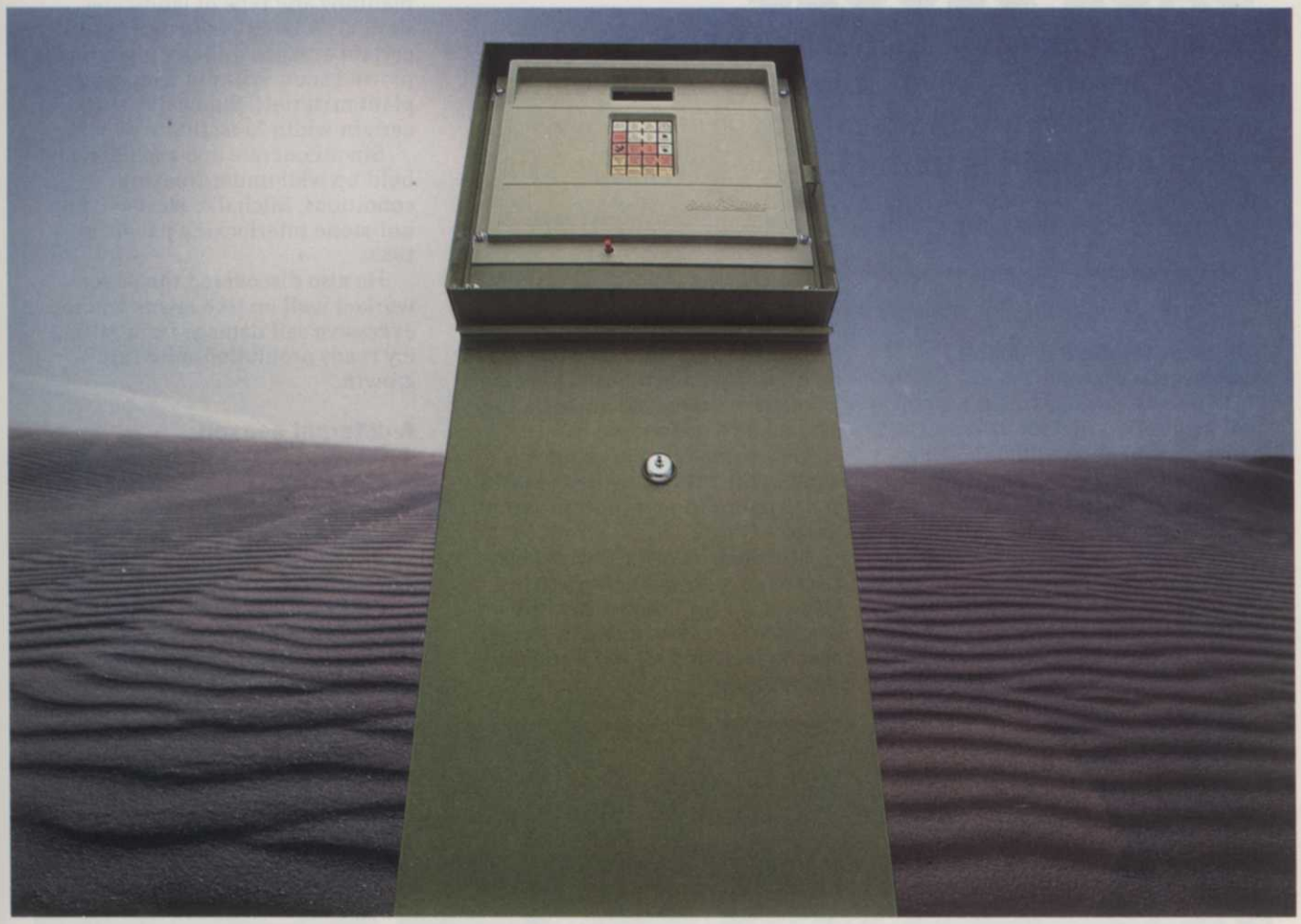

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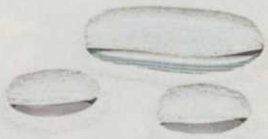

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COVER STORY

LANDSCAPE PROFILE

CASE CLOSED

There's no question that award-winning Case Western Reserve University in Cleveland is one of the finest landscaped urban universities in the U.S.

by Heide Aungst, associate editor

Spring is John Michalko's favorite season.

Typically, spring is a time many find inspiration in a robin's song, a bouquet of fresh-cut daffodils or a radiant sunset.

But to Michalko, landscape superintendent at Case Western Reserve University in Cleveland, spring signals an end to the drudgery of snow removal and the beginning of "real" work.

"To the operators winter might not be boring, but to me it is," Michalko says. "I know what has to be done. I see what has to be done. Whenever there isn't snow on the ground, I go out and do it."

Unfortunately, the campus is usually hit with snow five months a year, thanks in part to its proximity to Lake Erie.

Michalko's crews always clear roads and sidewalks for early classes, even on days when the campus closes because city streets aren't clear, or a bitter windchill factor looms.

Snow is always considered when planning any type of landscape design. At CWRU, the design of certain areas includes a place to put plowed snow without damaging plant materials. Sidewalks are a certain width to facilitate plowing.

Since concrete and asphalt don't hold up well under freezing conditions, Michalko started using uni-stone interlocking pavers in 1983.

He also discovered the pavers worked well on tree lawns where excessive salt damage from salting icy roads prohibited solid turf growth.

A different season, a different job

But when spring comes, Michalko buries the winter blues and concentrates on readying athletic fields and beautifying the campus for graduation ceremonies in late May.

Case held commencement outdoors for the first time in 1985. It was such a success that the administration plans to continue the practice.

Springtime at Case Western Reserve University in Cleveland means color in every corner of campus.

The Fusarium Blight Syndrome...

Photographs courtesy of Dr. Richard W. Smith, Oregon State University

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Michalko won the PGMS Grand Award for athletic fields in 1980 and plans to enter the competition this year. "Our fields are pushed to the maximum," Michalko says. Sometimes 60 intramural games are played on a field in one week.

Case has one intramural field for soccer and football which is marked with colored paints running in different directions. It also has six softball fields. Michalko uses a bluegrass/ryegrass mix on the fields.

The urban campus is at the hub of the University Circle area on Cleveland's cultural east side. Its properties are blended with those of the Cleveland Museum of Art, the Natural History Museum, the Cleveland Clinic, and the Garden Center of Greater Cleveland.

An early spring scene on the Case campus.

Because of the busy thoroughfares surrounding the campus, Michalko works hard at keeping even minor details, such as flowers around every university sign, in order.

A large volume of pedestrian traffic also makes the daily trek across campus. "Students will always take the shortest distance between two points," Michalko sighs. To prevent extensive turf damage, Michalko has built walkways and frequently uses shrubbery as a natural barrier.

Shrubbery must be maintained below three feet for security purposes.

Trees are trimmed regularly to promote their growth, enhance lighting, and increase visibility, he says.

Michalko says many schools are now planning landscape design in conjunction with security personnel. CWRU has done this during Michalko's eight years.

There are special considerations in working for a private university. For example, during finals week, works crews cannot run any power equipment before 9 a.m. "in case some students who were up all night studying want to sleep in."

Vandalism: a big problem

Perhaps the biggest problem Michalko must deal with is vandalism, ranging from broken sprinkler systems to spray graffiti.

It's often difficult to know if the vandalism was done as a fraternity prank or on a city kid's dare. "Kids will be kids," Michalko says.

One time the grounds crew set up stakes to tell where to snowplow. But during the night, someone moved the stakes. Needless to say, the crew never tried that again.

An advantage to working for a university, however, are the grants that come in earmarked for particular landscape use.

This spring Michalko and his crew will use funds from "friends of the university" to trim trees and plant new ones.

The money for special projects is used in addition to the regular operating budget, which Michalko wouldn't reveal.

"I tell the front office what I need and they handle the budgeting," Michalko says. "They'll tell me if I go over. One time we had a cutback and I was told to cut budgets, not people. New equipment and supplies went first."

Managing people: a tough job

Michalko uses a full-time, year-round crew of 15. His philosophy is to pay them well and give them a good benefit package to keep them happy with their job.

The university's benefit package includes free tuition for the employee and his family.

Still, dealing with 15 individuals is the part of the job Michalko finds most difficult.

"They all have their own personalities," Michalko says. "But they take pride in the campus because they see it every day. I'd stack 95 percent of them up against anybody."

Michalko would rather be out working with Mother Nature than dealing with human nature. His plan for the campus includes a color code, which means there is color on the campus at all times.
according to what color they turn in the fall to further enhance the autumn beauty of the campus.

A sugar maple will turn yellow, orange, and scarlet, while a tulip tree will turn yellow, a crown right pin oak will turn red and a sweet gum will turn orange and scarlet, he says.

Michalko works closely with landscape architects William Behnke Associates Inc. for all design changes.

Since 1977, many new vest-pocket parks, walkways and courtyards have been installed.

This year his major project is to renovate the landscaping around the dorms and fraternities, including adding an irrigation system. "All the major work is done," says Michalko. "There's just some minor tinkering left."

But for Michalko, that tinkering will probably never be finished. "My biggest challenge is trying to satisfy myself," he says. "I try to be a perfectionist. I want everything done just right."

Whether it's award-winning athletic fields, bright autumn colors or fresh spring flowers, Case Western Reserve University will always be in tip-top shape while Michalko is at the helm...even though snowplowing is a little boring. **WT&T**

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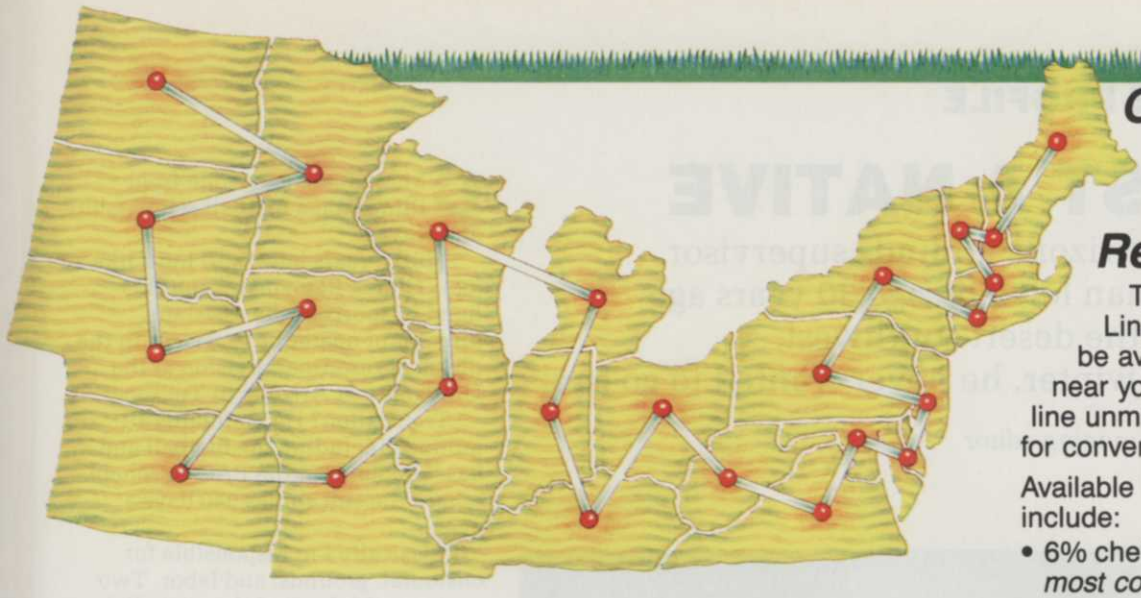

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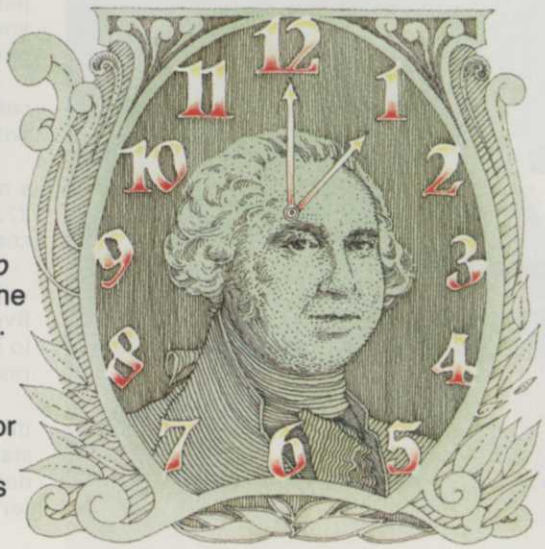

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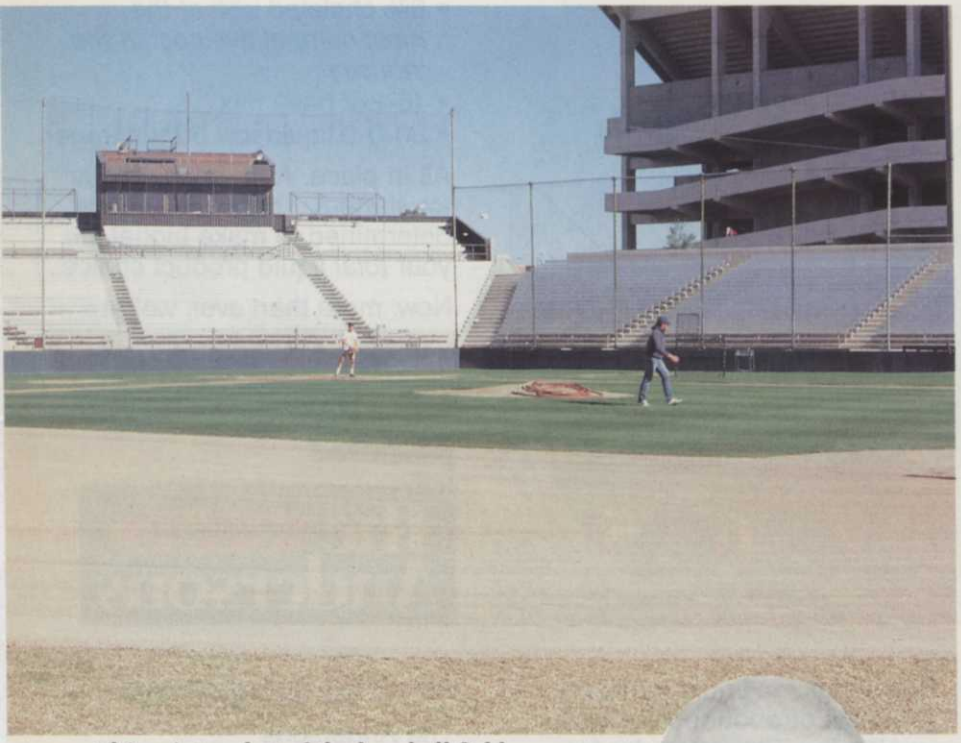
ALMOST A NATIVE

University of Arizona grounds supervisor Chuck Raetzman left Chicago 30 years ago for the sun of the desert southwest. After the first winter, he never wanted to go back.

by Ken Kuhajda, managing editor



This winter shot of the baseball field shows the lush green overseeded infield and dormant outfield.

Chuck Raetzman came from Illinois on a football scholarship and stayed.

Thirty years later, still built like a jock, Chuck Raetzman keeps his hand in sports as the assistant director of operations services in the physical resources division at the University of Arizona in Tucson.

Translation? He maintains all grounds including the football and baseball fields at the PAC-10 school where the sun shines 340 days a year.

"Basically I'm responsible for custodial, grounds, and labor. Two years ago I inherited the custodial part," says Raetzman, still trim and youthful at age 48. He carries 195 pounds on his 6-1 frame.

The grey hairs are there. They come with experience. He's 35 without them.

He's in his 18th year at the U of A, a medium-sized school (enrollment 27,000) with a pleasant, self-contained city campus.

He's one of some 800 employees within physical resources and one of five supervisors who report directly to Phil Rector, director of physical resources.

He manages a budget of $3 million, 80 percent coming from the state and the rest from local departments on campus which pay for maintenance services.

Bob Kneebone, retired turfgrass professor at the University of Arizona (left), has served as Raetzman's advisor for some 18 years. Raetzman, (right), is assistant director of operations services at the University of Arizona in Tucson.

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"I like to equate it with a small construction company," says Raetzman.

It's also a huge bureaucracy, he says, and not always easy to get the equipment and materials you need.

You make do. "There's been four different directors since 1968. Each one has reorganized," says Raetzman. "But things are working out well."

The Mac Attack

Maintaining a "for-profit" college can be a tough job.

Take September, 1977 for example. Chuck Raetzman and crew prepare for the regionally-televised home football opener. The field looks great.

Two weeks before the big game, the rock band Fleetwood Mac, then at the top of the rock world, plays a concert at the football stadium.

Big bucks for the university. Big headaches for Raetzman and crew.

Some 76,000 people attend, 56,000 in the stands and the rest on the beautiful bermudagrass turf.

The port-a-potties are located at the south end of the field.

The next day dawns. The morning is carved in Raetzman's memory.

The field, a total disaster, was like concrete from the pounding of 20,000 rock fans. The natural aisle formed in the middle of the field from goal line to goal line was yellow from the constant footsteps of potty-goers.

Glass, debris, cigarette butts, and yes, marijuana seeds littered the field. (Says Raetzman, able to smile today: "We had the greatest crop of marijuana growing after that concert.")

Raetzman and crew cried a lot and then did what they could. The turf didn't come back. The field had to be painted the entire season.

Rock concerts, as expected, are not one of Chuck Raetzman's favorite activities.

Nonetheless, he predicts a concert sometime this spring. Today's standard fare of the geo-textile fabric and plywood should prevent a recurrence of the Mac Attack.

"Even with the cover you're still going to get damage. Plus the clean-up. Here, you attract from four states and then they camp out all week," says Raetzman.

He gives thanks he doesn't maintain a public facility like Denver's Mile High Stadium, where they depend solely on concerts and special attractions for revenues.

Chuck Raetzman

'There are still people on campus after 4. They get to talk to our custodial workers. It helps with PR a little bit.'

—Raetzman

300 employees

Some 60 U of A employees maintain the grounds, including the athletic fields, at the central Tucson campus. Custodial workers total 200 while 24 general laborers, "a support group," maintain the campus.

That's almost 300 workers under Raetzman. They come in waves—two shifts—which Raetzman says makes for better public relations.

Second shift begins at 4 p.m. "There are still people on campus after 4," he says. "They get to talk to our custodial workers. It helps with PR a little bit."

Tucson's semi-arid climate provides plenty of work. The area, at 2,400 ft., gets just 11 inches of rain per year. The growing season lasts 264 days. That's a lot of mowing, trimming, and watering.

A four-man crew handles irrigation, almost a non-stop activity during the 100 degree heat of the southeast Arizona summer.

There's also a six-man sanitation crew. The boss, Raetzman, oversees the entire operation, calling on his three supervisors: Bill Carter (grounds), Mike Mencinger (labor), and Ron Roberts (custodial).

His personal background is in horticulture. He graduated from the U of A in 1960 with a horticulture degree and worked eight years for a landscape contractor in Tucson before returning to his alma mater.

From the snow to the sun

He came to Arizona from Chicago, where he was an all-city offensive and defensive guard at Amundsen High School (everyone played both ways in the days of leather helmets).

"It was a chance to see another area of the country, to get out of my own," he says. "I had travelled through Tucson before I went to school there and it was so different. The palm trees, the citrus, the weather. It was a chance for me to get out west."

In 1955, Raetzman and another Chicago-area player, also on scholarship at the U of A, packed their belongings and made the trip to the desert.

The scholarship athlete lettered three years at the U of A as an offensive guard and linebacker.

He never had the urge to return to Chicago. "Not after the first winter," he says.

Son Garrett has picked up the pigskin. The 21-year-old red shirt junior is a quarterback on the current Wildcat football team. He's bigger than pop. The 6-2, 200-pound social science major is around three on the depth chart, says dad.

Knowing your kid will be playing on turf you maintain must give you extra incentive to do a good job...

The turf is aerified six times a year, fertilized six to eight times yearly, and top dressed twice, once in December after the season and in May after spring football practice.

And then there's the U of A baseball team. Always among the top colleges, World Series champs twice. Impressive. Their field must be too.

They start their schedule of 50 home games in February. They practice year round though not on the game field.

Raetzman allows the common bermuda in the outfield to go dormant. Only the Tifway bermuda

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Over-the-top picture-perfect weed control.

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infield and foul areas are overseeded.

Most of campus turf, mainly common bermuda, turns brown in the winter. Overseeding is rare at the U of A. It's a luxury when Raetzman is worried more about getting a crew to a campus hall to fix a broken pipe.

Preventative maintenance

The snail's pace of the university bureaucracy can get to you. After 18 years, Raetzman deals with it.

He doesn't always get the equipment he needs when he needs it. Sometimes he doesn't get it at all. "With the operational funds, especially with equipment replacement, we just don't get the replacement money as soon as we would like," he says.

It's made him a better manager and his crew more effective. "We still have mowers that are 8, 10, 12 years old. That's a compliment to the PM (preventative maintenance) guys. PM takes money out of our operation but that's what you have to do."

The department's 17-year-old backhoe was finally replaced this year.

"In the last several years the administration has been a lot more receptive. This year we probably have the most capital equipment money we've had since I've been here," says Raetzman.

It's a sign that Raetzman and his crew are landscaping their way out of anonomity.

He's excited about that. "I like the thought of being involved in the future of this university," he says. **WT&T**

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SUBDUE

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The Palm Court on the University of Miami campus.

TROPICAL ARBORETUM

The University of Miami in Coral Gables, Fla., boasts a landscape cornerstone of 25 palm tree varieties. And the landscape has just begun to be taken seriously.

by Heide Aungst, associate editor

The University of Miami in Coral Gables, Fla., could be described as a tropical paradise. But just a few years ago it was a wasteland.

No one paid much attention to the school's landscape. Lethal yellow wiped out most of the coconut palm trees, and landscape design seemed almost nonexistent.

Then, in 1982, Edward Foote was named university president. "The president came here with a dream, and that dream is being carried out," says Clarence Lefler, director of the physical plant. Lefler was in his position only a few months before Foote took over the campus.

Foote's dream was to make the university into a tropical arboretum. With more than 25 varieties of palms on campus, many donated fully-grown from the estate of a wealthy widow, his dream is coming true. Campus landscaping is so important to Foote that he even requires the crew to cut the hedge outside his office in an A-frame, which allows light to get to the under branches.

"President Foote's philosophy is to create a setting so the kids know they are in south Florida," says Alan Weber, director of grounds/landscaping for ARA Environmental Services. "He feels it's conducive to learning."

The university has contracted with ARA since 1978 for grounds maintenance, custodial, and moving services, explains Boyce Level, ARA resident manager. Level has worked for ARA for about three years.

Though not employed by the university, Weber and Level work directly with Lefler on planning and maintenance.

87 foster children

They affectionately call Lefler "Dad," an appropriate title for a man who, along with his wife Lois, have raised five children of their own, adopted one, and have been foster parents to 87 others. Lefler projects the same deep sense of caring with "his" campus, as he does with his children.

"Our goal was to first do a bunch of little spots on campus to get the overall feeling of improvement," Lefler explains. He negotiated four groundskeepers to do small projects taking less than a week, such as planting a hedge.

One of these projects was to plant ferns under the ficus trees, known

continued on page 40

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A well-landscaped plot on the south Florida campus.

for their extensive root systems. Ficus trees cannot be planted near buildings since the roots can easily break through the concrete.

Several ficus trees grow on the banks of the university's lake, since the roots protect the bank from erosion.

The 6.3 acre lake, located at the back of the campus, is equipped with its own alligator and barracudas.

Although the crew cleans the man-made lake regularly, no chemicals are used to upset the ecological balance of the saltwater intrusion in the lake.

"We haven't transformed the lake into a swimming pool," Weber says. Many of the plants on the banks are left wild to maintain the natural look. Steps carved out of coral stone are located on one side of the lake. Weber says no one could afford to buy similar steps today.

It is hard to decide whether the lake or an area known as "Palm Court" is the most beautiful part of the campus.

Palm Court was developed two years ago. Royal palm trees surround a cascading jet 7,000-gallon fountain. Concrete blocks are arranged in a checkerboard pattern between the trees where students can sit and study. A brick paved pathway leads up to and encircles the fountain.

That pathway causes Weber a few headaches. Since everything grows so rapidly in southern Florida, weeds and grass pop—up quickly—occasionally between the bricks. Crewmen spray the bricks but are careful to avoid killing neighboring turf.

St. Augustine turf is used on the approximately 250-acre campus, of which 150 acres are intensively maintained. "St. Augustine grows horizontally. It takes the heat, covers rapidly and doesn't need to be highly maintained," Weber says.

Regular pruning

When Weber started working on the university about a year ago, he discovered most of the grass under the trees had turned brown from lack of light.

The trees are now pruned regularly to allow the light to get to the turf. Also, removing the lower branches makes the campus safer for the many blind students.

Weber tries to achieve a balance with planting shade trees so students can get relief from the heat and pruning trees back.

The pH levels are so high in south Florida soils that plants need extra nutrients to grow. Fertilizers alone don't provide enough nutrients, so crews regularly spray through the leaves.

Weber also puts a weather shield, most frequently on the palms, which is a thin coating used to maintain moisture in the leaf and prevent windburn and sunscald.

The university's irrigation system stretches nearly 100 acres. Watering is crucial because of the quick drainage of the sandy soil.

Weber often uses a polymer under the root system of a newly-planted tree since it can expand and hold 30 times its size in water. Overwatering, however, can cause an outbreak of dollar weed, the campus' biggest enemy next to fireants which also invade regularly.

Weber says he goes through equipment faster than northern schools because it's used year round. He uses his lift trucks most extensively and keeps at least five chainsaws on hand because of the amount of pruning.

The baseball field, home to the high-powered Hurricanes, has synthetic turf, which suffers from mildew.

The crew maintains two soccer fields and two football fields of bermudagrass. The four fields are all practice fields only and, therefore, don't require special maintenance.

Weber would rather put his time into designing areas on the campus. Although the university often contracts out for landscape design, Weber prides himself on the areas of campus he has designed.

Before coming to the university he worked at Miami's Baptist Hospital. There, he won the American Association of Nurserymen's national award for institutional design. He will receive his award in Washington, D.C. this month.

One area he has designed is the student union. He says he's most proud of this since so many people walk through the area each day.

Weber put in planters with ferns, crown thorns, and solotaire palms to brighten up the union. With the combination of Weber's design changes and Lefler's designated three-man crew for short term projects, the campus is indeed resembling paradise.

The hurricane factor

But when paradise is located in southern Florida, your crew has to be prepared for hurricanes. Hurricane season runs from June to November.

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"Ahead of hurricane season we do a massive trimming program," Weber says. "We take coconuts off the palm trees and pick up all the loose stuff."

Level says the university has a set procedure the grounds crew follows during a hurricane threat. "We have a red team and a blue team," Level explains. "One is on call while the other goes home and gets ready to clean up after."

Lefler says the last hurricane to directly hit the Miami area was in 1965. Still, he charts the paths of all recent hurricanes along the Atlantic coast.

Another problem is Haitian and Cuban employees. Most are not trained in groundskeeping, and often the language barrier makes it difficult for Weber to communicate.

He has learned a bit of Spanish to open communication lines. That's not uncommon for a landscape director who holds degrees in history, hotel and restaurant management, and horticulture.

The crew seems to enjoy working at the only major U.S. university in the subtropical zone. (Texas, Arizona and California are subject to freezes lasting consecutive days.)

Weber says sometimes it's hard to motivate the crew in the steaming summer heat and he gives them more frequent breaks to cope with high temperatures and high humidity.

Some crew members pick their own coconuts from the campus palm trees, freeze them, and drink the ice cold juice for relief.

The most recent project is re-landscaping the panhellenic building. Lefler says such special projects usually cost an estimated $3,000 to $25,000. He describes his general maintenance budget as "just over $500,000."

The University of Miami is home to about 15,000 students, many of whom come from out of state for the warm weather and beach not even 10 miles from campus.

The traffic through the campus can damage plant materials. It has become second nature to Weber and Level to tear down signs stapled to tree trunks as they walk by.

Both have such easy going personalities that they quickly overlook the damage done when students sit on plants or tear leaves off shrubs. "That's OK. They should enjoy the atmosphere," says Weber. "You can't worry that everyone's going to step on your plant...As long as they don't bang it up too much."

To campus visitors and even returning alumni the campus doesn't look "banged up" at all.

"In the last year we've had very positive reports," Lefler says. "The exciting thing is when someone who graduated six or seven years ago returns. The change is so dramatic."

The radical changes are past now. Small planting projects, the addition of even more varieties of palms, and design modifications in conjuction with several building renovations are planned in the future.

Although the university's new look was first envisioned by only one man, everyone on campus now shares in the pride of maintaining it. The University of Miami is a tropical paradise. **WT&T**

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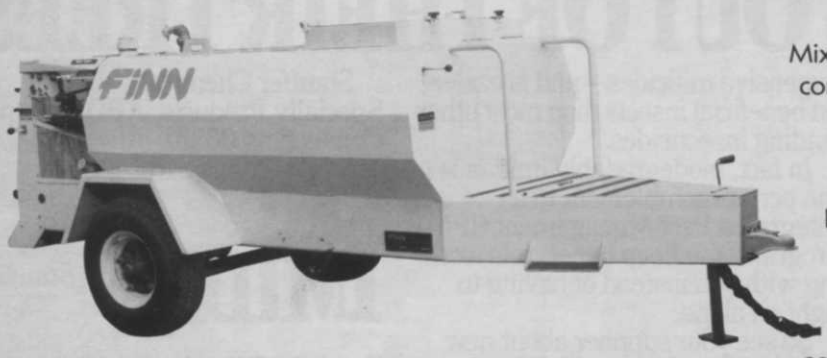

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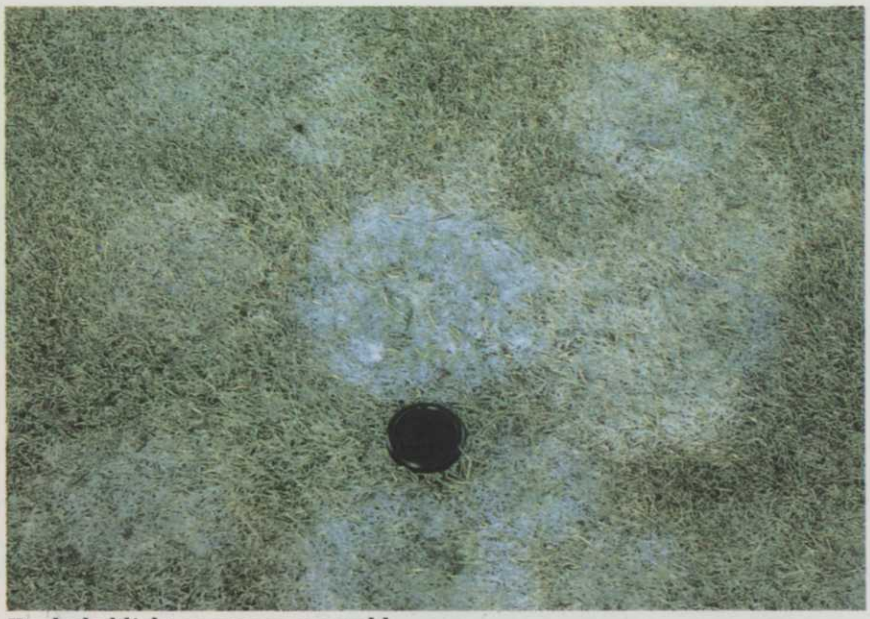
COOL-SEASON TURF DISEASES

by J.M. Vargas, turfgrass pathologist, Michigan State University



Typhula blight or gray snow mold.

Concepts about turfgrass diseases and their management have gone through many changes in the past few years, including the scientific names of the organisms that cause them.

These diseases, the organisms that cause them, and their cultural, biological, and chemical management tools are given in Table 1 (page 46).

The following will be a discussion of the latest developments on cool-season turfgrass diseases.

The patch diseases

There are a group of diseases that produce patches on desirable turfgrass species primarily by attacking the root system of the plants. This group of diseases was often mistakenly referred to as **Fusarium** blight in the past.

There are many other patch diseases of turf but they primarily attack the foliage, crowns, rhizomes, and stolons.

Summer patch

It has become increasingly evident over the past few years that summer patch, caused by *Phialophora graminicola*, is a primary disease of annual bluegrass during warm weather.

It can also be found on Kentucky bluegrass and fine-leaf fescues, but far less frequently.

On annual bluegrass, the initial symptoms are a yellowing of the turf in patches, usually 6 inches to one foot in diameter, followed by a thinning of the turf with the remaining turf turning bronze in color.

If warm weather persists all the turf in the patches may die. Most of the creeping bentgrass cultivars are resistant, and creeping bentgrass frequently can be seen recolonizing the centers of these patches.

Preliminary data indicate that soil temperature and soil moisture may be important in the development of this disease.

Excessive irrigation during hot periods or absence of irrigation following the hot period may make the diseases more severe.

Fungicides for the management of summer patch can be found in Table 2 (page 46). High rates of application are required to manage this disease and fungicides such as Tersan 1991, Fungo 50, and Cleary's 3336 will have to be drenched in to be effective.

Necrotic ring spot

It now appears that necrotic ring spot, caused by *Leptosphaeria korrae*, is the primary patch disease found on Kentucky bluegrass.

The symptoms can be observed throughout the growing season even though *L. korrae* appears to be most active during the cooler weather of the spring and fall. The plants that were infected by *L. korrae* in the cooler weather are in a weakened condition and are very susceptible to summer heat stress or drought stress.

Subjecting the necrotic ring spot plants to either of these stresses will lead to the death of the weakened plants and the recurrence of symptoms, even though the pathogen may not be active at this time.

The initial symptoms are patches 6 inches to two feet in diameter with straw- and red-colored blades intermingled in the patch.

Older patches may have green grass in their centers with the straw- and red-colored blades in the outer area of the ring, giving a frog-eye appearance. When symptoms appear in the warm weather, the red blades are often scarce.

Nitrogen is important for recovery of the patches caused by necrotic ring spot. Three to five pounds of actual nitrogen/1,000 sq. ft./season is necessary to promote recovery of necrotic ring spot patches.

Proper cultural practices are also important in patch recovery and in the prevention of new ones.

These include coring to relieve compaction and layers that result when sod of one soil type is laid on top of soil of another, which is common practice during the establishment of home lawns and commercial

continued on page 48

Resplendent in the afternoon sun, Dodger Stadium, home of the Los Angeles Dodgers, plays host to another record setting crowd.

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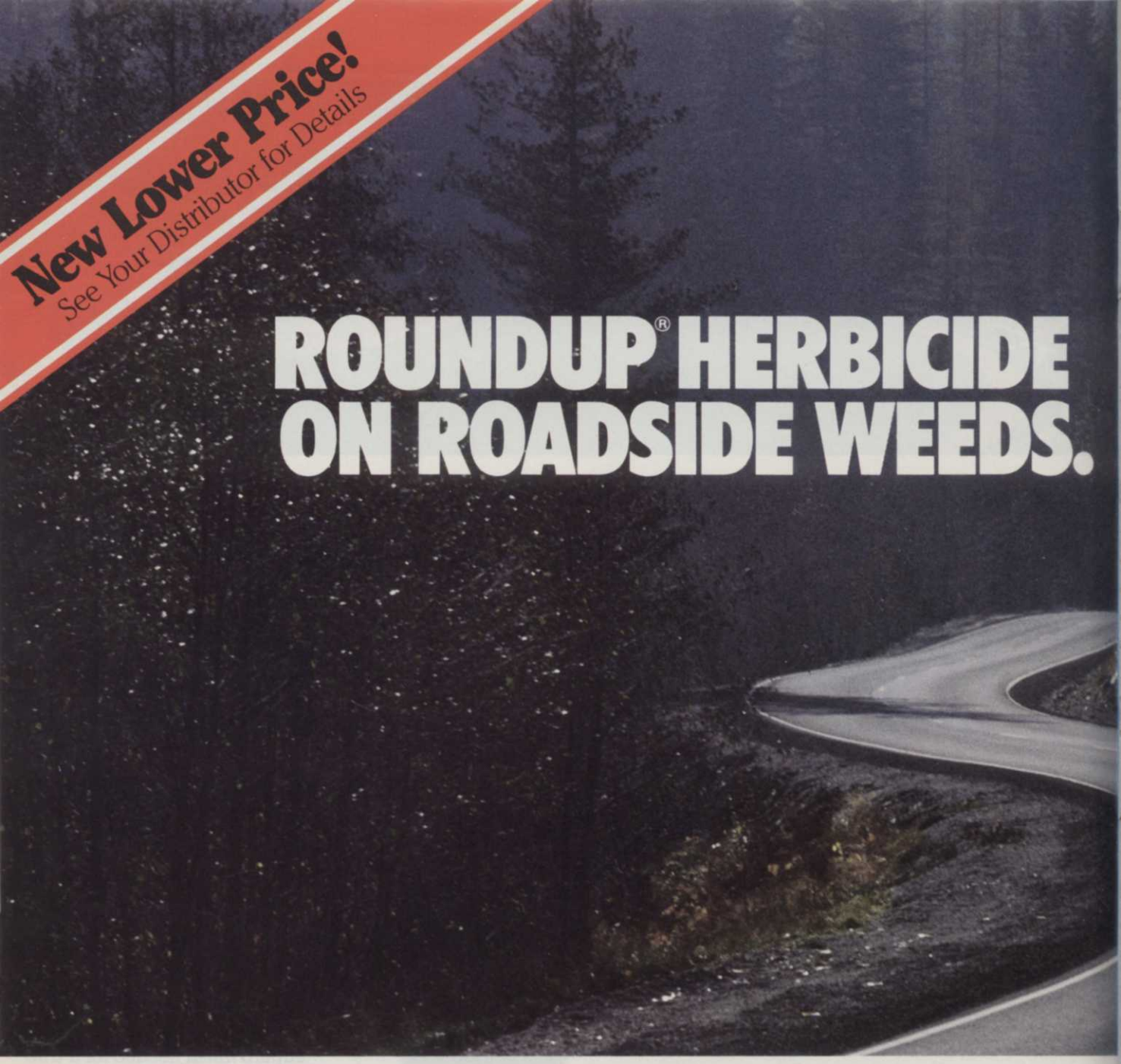
The grass machine.



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Circle No. 137 on Reader Inquiry Card

TABLE 1
The patch disease, casual organism and primary host.

Disease	Organism	Primary Host
Summer patch	*Phialophora graminicola*	Annual bluegrass
Necrotic ring spot	*Leptosphaeria korrae*	Kentucky bluegrass
Take-all patch	*Gaeumannomyces graminis*	Creeping bentgrass

Red thread on perennial ryegrass.

lawn properties.

This results in short rooting during the warm weather (when the roots of the turfgrass plant are confined to the upper layer).

Coring and re-incorporating the soil back into the thatch will, over a period of years, alleviate the layering problem. It may also help manage any potential thatch problem, which is important in managing necrotic ring spot. Thatch has a poor moisture holding capacity, and turfs growing in a thick thatch are more susceptible to drought stress.

Light, frequent irrigation is also important in managing this disease. The theory that deep, infrequent irrigation is more beneficial to turf development is just that, a theory. Preliminary research data indicates that light, frequent waterings may be more beneficial to the turf. Such waterings on a daily basis, around midday, have certainly been shown to help manage necrotic ring spot. The turf appears to be benefitting culturally from the cooling of the turf and biologically from the build-up of beneficial micro-organisms in the moist thatch that may be antagonistic to *L. korrae*.

Lawn Restore, Green Magic, and Strengthen and Restore are products which appear to be supplying some biological management of necrotic ring spot. These products contain antagonistic micro-organisms (Lawn Restore) or their by-products (Green Magic, Strengthen and Restore). They have been effective in promoting the recovery of necrotic ring spot patches and preventing the development of new ones.

The key word is "management." These products are not a one-shot cure, but used systematicaly on a regular basis, they will manage this disease and provide a healthy turf.

In addition to the antagonistic micro-organisms and their by-products, these products contain the major and micronutrients necessary for a healthy turf.

Take-all patch

Take-all patch, caused by *Gaeumannomyces graminis* var. *avenae* was formerly known as *Ophiobolus* patch caused by *O. graminis*.

This disease was originally thought to be confined to the Pacific Northwest. It has now been reported throughout the United States and Canada wherever creeping bentgrass is grown.

Lowering the pH through the use of sulfur still appears to be the best way to manage this disease.

A word of caution: the granular sulfur products have been observed to cause injury to the turf the season following application. This injury initially resembles dollar spot. The sprayable sulfurs are just as effective and do not have the bad side effects.

OTHER DISEASES

Dollar spot

Dollar spot was considered a disease which occurred primarily on golf courses. However, with the introduction of the new perennial ryegrasses, it is becoming an important problem on home lawn turfs.

The disease was originally believed to be caused by *Sclerotinia homoeocarpa*, but is now believed to be caused by two other organisms, a *Lanzia* spp. and a *Moellerodiscus* spp.

Identification of the two fungi as dollar spot's cause helps explain some of the confusion that has existed about the occurrence of this disease.

It has been, and still is, considered both a cool-weather and warm-weather disease. Two different fungi appear to have caused a disease with similar symptoms. This means that you can have dollar spot at any temperature between 60 to 85 degrees F.

An easy, reliable method to distinguish the difference between these two fungi in the field is thus needed.

Fortunately, dollar spot caused by both fungi appears to be reduced by adequate nitrogen levels. For the most part, they are also managed by the same fungicides, although the question is raised whether to some fungicides might not be due to the differential sensitivity of the two fungal species causing this disease.

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Circle No. 166 on Reader Inquiry Card

TABLE 2
Turf Disease and Controls.*

Disease	Causal Agent	Hosts	Biologial and Cultural Control	Chemical Control
Anthracnose	*Colletotrichum graminicola*	Annual bluegrass Fine-leaf fescue Kentucky bluegrass Perennial ryegrass	Adequate nitrogen. Cool grass by syringing.	Maneb plus zinc sulfate, chlorothalonil, benomyl, thiophanate-methyl, thiophanate, thiophanate-methyl + mancozeb, triadimefon
Brown patch	*Rhizochtonia solani*	All major turf-grass species	Reduce nitrogen. Remove "dew." Increase air movement.	Mancozeb, maneb + zinc sulfate, chlorothalonil, anilazine, cycloheximide + thiram, benomyl, thiophanate-methyl, thiophanate, thiram, thiophanate-methyl + maneb, cadmium compounds, thiophanate + thiram, PCNB, iprodione, vinclozolin
Dollar spot	*Lanzia spp.* *Moellerodiscus spp.*	Annual bluegrass Bahiagrass Bermudagrass Centipedegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass St. Augustinegrass Zoysiagrass	Increase nitrogen. Remove "dew."	Benomyl, thiophanate, thiophanate-methyl, chlorothalonil, anilazine, cycloheximide + PCNB, cadmium compounds, thiophanate + thiram, thiram, thiabendazole, benomyl, iprodione, thiophanate-methyl + maneb, vinclozolin, triadimefon, fenarimol
Summer patch	*Phialophora graminicola*	Annual bluegrass Kentucky bluegrass	Light, daily watering during the summer.	fenarimol, thiophanate-methyl, thiophanate, triadimefon, iprodione, benomyl
Helminthosporium Diseases	*(Dreschlera)*			
Brown blight	*D. siccans*	Ryegrass	Remove clippings.	Mancozeb, chlorothalonil, cycloheximide, anilazine, maneb + zinc sulfate, cycloheximide + thiram, cycloheximide + PCNB, iprodione, vinclozolin
Leaf blotch	*D. cynodontis*	Bermudagrass	Raise cutting height.	
Melting-out	*D. poae*	Kentucky bluegrass	Plant resistant cultivars. Moderate spring nitrogen.	
Net-blotch	*D. dictyoides*	Fescue		
Red leaf spot	*D. erythrospila*	Creeping bentgrass		
Stem and crown necrosis	*D. specifera* *D. gigantea*	Bermudagrass Bermudagrass	Daily irrigation.	
Zonate Eye spot	*Bipolaris sorokiniana*	Bentgrass, fine-leaf fescue, Kentucky bluegrass		
Leaf spot				

Brown patch

Brown patch was a disease believed to occur primarily on golf courses. However, again, with the introduction of the new improved perennial ryegrasses into home lawn turfs, it is also becoming a problem on home lawns.

The disease occurs under hot, humid conditions. It can be culturally managed by reducing the amount of nitrogen applied just prior to the advent of warm weather, and by increasing air circulation by removing and/or pruning trees or shrubs.

Pythium blight

Pythium blight was also a disease primarily occurring on golf courses, but, like dollar spot and brown patch, it is becoming more of a home lawn problem with the incorporation of the improved perennial ryegrasses into home lawn turfs.

There still seems to be some controversy over how many species of *Pythium* are involved in this disease. But regardless of how many or how few there are, they do tend to cause rapid loss of turf in hot, humid weather. Unlike many diseases where only the foliage is damaged and recovery occurs quickly, *Pythium* blight usually kills the plant. This means recovery in the infected areas will be slow because it will have to come from rhizomes or stolons that fill in from outside the spots or by germination of annual bluegrass or broadleaf

continued on page 54

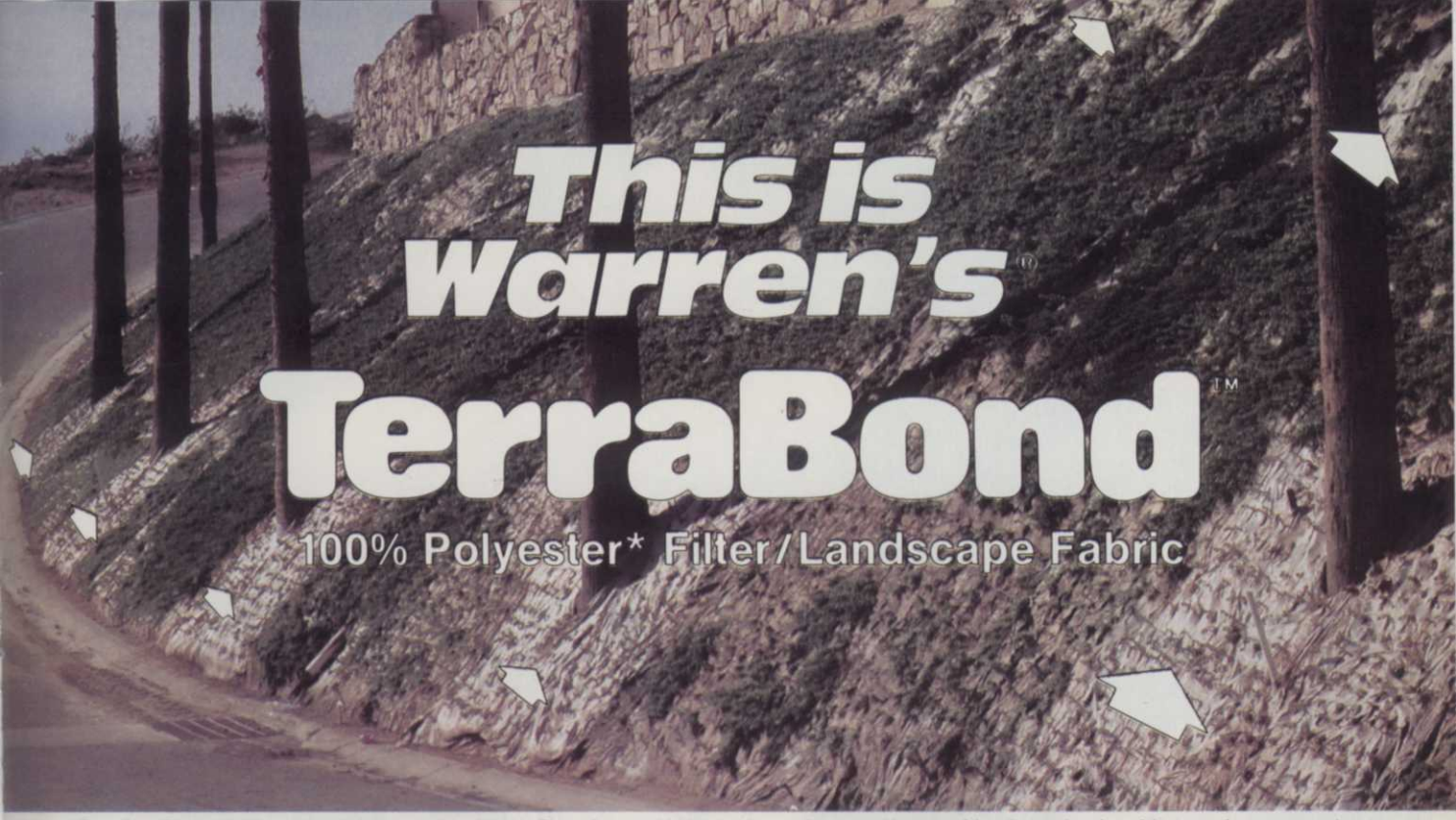

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TABLE 2 *continued*

Disease	Causal Agent	Hosts	Biological and Cultural Control	Chemical Control
Take-all patch	*Gaeumannomyces graminis*	Creeping bentgrass Kentucky bluegrass Velvet bentgrass	Reduce soil pH. Avoid liming, Use acidic fertilizers. Sulfur.	fenarimol
Pythium blight (cottony blight)	*Pythium spp.*	Perennial ryegrass Creeping bentgrass Annual bluegrass	Improve soil drainage. Increase air circulation.	chloroneb, ethazol, metalaxyl, propamocarb
Red thread	*Laetisaria fuciformis*	Creeping bentgrass Colonial bentgrass Bermudagrass Annual bluegrass Perennial ryegrass Fine leaf fescues	Increase nitrogen.	anilazine, iprodione, triadimefon, vinclozolin, chlorothalonil
Pink patch	*Limonomyces roseipellis*	Perennial ryegrass Creeping bentgrass Fine leaf fescue	Increase nitrogen.	Try red thread fungicides
Snow molds *Typhula* blight *Fusarium* patch	*Typhula spp.* *Fusarium nivale*	Annual bluegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass Tall fescue Velvet bentgrass	Avoid early fall nitrogen fertility that leads to lush growth.	Mercury compounds, PCNB products, chlorothalonil, chloroneb. These products may have to be used in combination for effective snow mold management. Benomyl, iprodione or mancozeb will control *Fusarium* patch where it occurs alone.
Necrotic ring spot	*Leptosphaeria korrae*	Kentucky bluegrass	Nitrogen to promote recovery. Light daily irrigation. Lawn Restore, Green Magic, Strengthen & Restore.	iprodione, fenarimol, benomyl, thiophanate, thiophanate-methyl

**The order in which fungicides are presented does not imply the order of their effectiveness.*

weeds when the cool weather of the fall returns.

Cultural management of *Pythium* blight consists of reduced nitrogen levels just prior to the advent of warm weather and improved drainage. Concerning the latter, in marginal areas of the cool season grass regions, *Pythium* blight is only a problem in areas of poor soil drainage, where water stands for prolonged periods.

In regions where severe *Pythium* blight damage occurs, it is always most severe in poorly drained soil areas. So good *Pythium* blight management begins with improving soil drainage.

As far as chemical management is concerned, two systemic fungicides, metalaxyl and propamocarb hydrochloride, are available to manage the disease for up to three weeks. They appear to be slower acting than chloroneb or ethazol.

Little spread of the disease occurs after these systemic fungicides are applied, although the mycelium of the fungus may remain evident on the previously infected tissue for a couple of days. No actual resistance to these two fungicides has been reported, but the possibility exists.

It would be wise, therefore, to follow each systemic fungicide application with a contact fungicide (chloroneb or ethazol) application so if resistance does occur following a systemic fungicide application, the contact fungicide will prevent the resistant strain from devastating the turf.

Anthracnose

Anthracnose, caused by *Colletotrichum graminicola*, is primarily a disease of annual bluegrass, although it will attack the fine-leaf fescues, perennial ryegrasses, and seaside creeping bentgrass.

Annual bluegrass dies from anthracnose during heat-stress periods of the summer, and not due to heat alone, as was once believed. If proper cultural management is followed and effective fungicides are used, annual bluegrass will survive the summer heat stress period like any other perennial.

One good cultural practice consists of deep, vertical mowing early in the spring, as soon as growth is initiated for the season. This will allow for the

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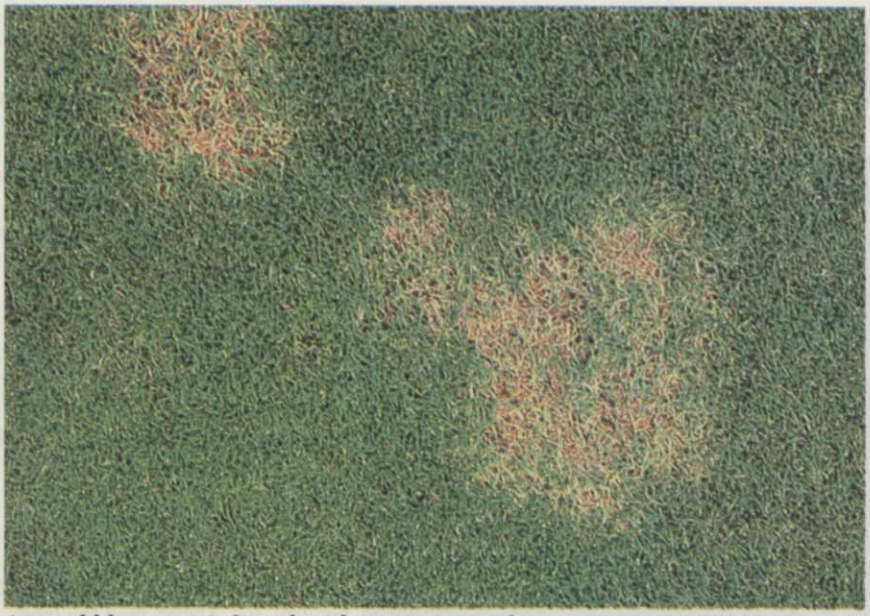

Annual bluegrass infected with summer patch.

production of new, juvenile growth which should be more resistant to heat stress. Coring should follow a week or two later for good root growth.

A second coring cultivation should be done following heavy seedhead production in the late spring to provide an optimum medium for maximum root growth (the coring holes) in the few remaining weeks prior to the heat stress period.

If only one coring operation a year can be done, this is the time to do it, because over 70 percent of the annual bluegrass roots disappear during heavy seedhead production.

A third coring operation should be done when the cool nights of late summer and early fall return. Light nitrogen applications should be made, i.e. ½ pound actual nitrogen per 1000 sq. ft. in June, July, and August for a healthier annual bluegrass plant and to reduce the amount of inoculum produced by *C. graminicola* for subsequent infection during the remainder of anthracnose season.

Finally, one of the effective fungicides mentioned in Table 2 should be used to assure healthy turf. A computer model has been developed which predicts the occurrence of anthracnose based on average daily temperatures and continuous hours of leaf wetness. Fungicides for the management of anthracnose can now be applied when the disease occurs, instead of on a calendar basis.

The snow molds

There are two prevalent snow molds in the U.S., *Typhula* blight (gray snow mold) and *Fusarium* patch (pink snow mold).

Gerlachia (Fusarium) Patch: Fusarium patch, caused by *Fusarium nivale*, becomes a problem in the fall when the temperature drops into the low 60s or lower, and continues at these levels through the spring. Disease activity may continue until the daytime temperature climbs back in the 70s.

It is usually first noticed in the shaded areas of greens, tees and fairways. *Fusarium* patch does not need snow cover to become active, only cool, wet weather. Annual bluegrass is especially susceptible to *Fusarium* patch. In the spring, the disease is often mis-diagnosed as copper spot, because of the small copper colored spot that it causes.

However, copper spot is a disease that occurs in warmer weather. Keeping the nitrogen at low levels during the time when *Fusarium* patch may be active is important in helping manage the disease.

Typhula blight: *Typhula* blight is caused by two species, *Typhula incarnata* and *T. ishikariensis*. *T. incarnata* is the primary species in the eastern U.S. and in southern and mid-regions of the Midwest and western U.S.

*T. ishikariensis*is most prevalent in the more northern snow mold regions, especially where prolonged periods of permanent snow (two or more months) exist in the midwestern and western U.S.

The two *Typhula* species are easily distinguished from each other when observed soon after the snow melts. *T. incarnata* produces grayish spots in the turf, with scattered, fairly large, brown sclerotia evident, whereas *T. ishikariensis* spots have a reddish cast to them and contain numerous small, dark black sclerotia.

Nitrogen is important for recovery of the patches caused by necrotic ring spot.

Typhula blight only occurs under snow cover. It does not occur in the cool, wet weather of fall and spring, except under leaf piles.

Knowing which species you have is important in chemically managing the disease. Many fungicides, including the mercuries, chloroneb, PCNB, triadimefon and chlorothalonil, will manage *Typhula* blight caused by *T. incarnata*. They do not all manage *Typhula* blight caused by *T. ishikariensis*. The picture also is more confusing state by state.

For example, in Michigan the mercuries, PCNB, and chlorothalonil will manage both species, but triadimefon and chloroneb will not manage *Typhula* blight caused by *T. ishikariensis*.

In northern Wisconsin and Minnesota, combinations of the mercuries and PCNB are required to manage both species. You should check with your local turfgrass experts to find out which fungicides are effective in your area.

Melting out

This disease is often incorrectly referred to as leaf spot. To be correct, melting out caused by *Dreschlera poae* (formerly *Helminthosporium vagans*), is a cool-season disease of Kentucky bluegrass that occurs in the cool, wet weather of the spring.

The disease starts out as spots on the leaf blades and, in a two- to three-week period, rapidly moves down the leaf sheath and into crowns and roots.

The entire grass plant is often killed

continued on page 60

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Necrotic ring spot on Kentucky bluegrass.

or severely damaged during this period, which is where the term melting out arises. The entire stand of Kentucky bluegrass seems to melt away.

Leaf spot, on the other hand, is a warm weather disease of many grass species, caused by the fungus *Bipolaris sorokiniana* (formerly, *Helminthosporium sativum*).

Ignore the idea... that the lawn doesn't need watering because we just had a heavy rain.

There are many Kentucky bluegrass cultivars that are resistant to melting out, the first of which was Merion.

Some of the newer Kentucky bluegrass cultivars—Parade, Baron, Cheri, Majestic, etc.—have some resistance to melting out, although it is not the same excellent resistance Merion had.

Consequently, stands of some of the newer Kentucky bluegrass cultivars may be thinned by melting out in the spring, allowing for invasion by crabgrass, quackgrass, tall fescue, and/or broadleaf weeds. This means cultural, biological and chemical management practices to reduce the severity of melting out will have to be incorporated into your turf management programs.

Helminthosporium melting out is one of the oldest, most-written-about turfgrass diseases. Unfortunately, much of what has been written about the disease, is based on "folk lore" and not on good scientific data.

First, much of the older literature refers to melting out and having a "leaf spot stage" in the spring during the cool, wet weather and a "melting-out stage" in the spring during the hot weather of the summer.

But, anyone who is familiar with the disease knows all the damage is done during the cool, wet weather of spring. With the arrival of warm weather, the turf begins to recover.

Secondly, practically all the literature advises against the application of spring nitrogen, because it will increase the severity of *Helminthosporium* melting out.

It appears the research that lead to this erroneous conclusion was based on greenhouse data and not field data.

At Michigan State University, data from the last four years suggests that just the opposite is true. Nitrogen in the spring actually reduces the severity of *Helminthosporium* melting out.

We recommend two nitrogen applications during the spring period to help manage *Helminthosporium* melting out, each between ½-1 pound of actual nitrogen/1000 sq.ft.

The third management practice is biological in nature. It consists of daily irrigation to keep the mat or thatch moist and to encourage the build-up of antagonistic micro-organisms that prevent the fungus *D. poae* from sporulating, germinating, or infecting.

These antagonistic micro-organisms may even possibly destroy *D. poae*. While the causes have not been discovered, the results have shown a dramatic reduction in the amount of *Helminthosporium* melting-out, where light, daily irrigation has been applied.

The actual concept may be hard to grasp since the disease occurs under cool, wet weather conditions, but apparently just a few days without rain allows the top of the thatch to become dry and allows the *D. poae* fungus to grow and infect these grass plants.

Remember, the key to having the daily irrigation program work is daily irrigation. You have to ignore the idea that the lawn doesn't need watering because we just had a heavy rain. You aren't irrigating the turf, you're irrigating the thatch to keep it moist.

This is not to say we have eliminated the need for fungicides in managing this disease. That may some day be a reality, but much more research needs to be done on the mechanisms involved in biological and cultural management of *Helminthosporium* melting out.

In the meantime, there are many excellent fungicides for the management of *Helminthosporium* melting out listed in Table 1. Also, remember, following good cultural and biological practices will help improve the disease management obtained with the fungicides.

For people in the lawn care industry, there are now three excellent fungicides which will manage *Helminthosporium* melting out during the three to four weeks it is normally a problem in the spring; iprodione, vinclozolin, and chlorothalonil.

There is a possibility that anilazine may also manage the disease for the desired period of time, although more research is needed.

Remember, maintaining adequate levels of nitrogen will make these fungicides more effective.

Red thread

Red thread was believed to be caused by *Corticium fuciforme*, but new evidence has shown the correct name to be *Laetisaria fuciformis*. Also, the disease complex formerly referred to as

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Circle No. 150 on Reader Inquiry Card

red thread has been split into two diseases: red thread and pink patch.

Red thread is an especially serious problem on slow-growing turf, whether growing slowly from lack of adequate nutrition, irrigation, or the cold weather.

New perennial ryegrasses are highly susceptible to red thread and with more of these varieties being used in home lawn turfs, this disease is becoming more and more important.

Red thread can be recognized by the red to coral pink stroma present on the foliage. The stroma appear fleshy and gelatinous when the turf is moist, later drying to become thin and thread-like. The lawn may appear as though it is infected with *Helminthosporium* or dollar spot, when viewed from a distance.

Adequate nitrogen and irrigation will manage the disease on Kentucky bluegrass and fine-leaf fescues and help reduce the severity of this disease on perennial ryegrass.

However, perennial ryegrasses are so susceptible to red thread that fungicides will be necessary to manage the disease when severe outbreaks occur.

Pink patch

This disease was formerly grouped under red thread, which was believed to be caused by *Corticium fuciforme*. Pink patch is now considered a separate disease caused by *Limonomyces roseipellis*.

Like red thread, it is primarily a cool weather disease which is more severe under conditions of low fertility. It primarily attacks the above ground portions of the grass plant.

The disease is first evident along the margins of the leaf blades, as small, irregularly-shaped blotches of pink. Eventually, the entire width of the blade may take on a pinkish cast. The pink mycelium never becomes as pronounced as the stroma of the red thread fungus.

Pink patch has been known to be a problem on perennial ryegrass and fine-leaf fescue for some time. It has recently been found to be a problem on creeping bentgrass, in particular, Penneagle. This is probably due to the fact that Penneagle is more susceptible than the other creeping bentgrasses and to the trend toward lower rates of nitrogen on golf course greens.

When pink patch occurs on closely mowed turf, the patches are anywhere from a few inches to two feet in diameter.

If you don't have a dissecting scope or microscope handy to distinguish the two diseases, place a sample of the diseased turf in a plastic bag with a moist paper towel and seal it. In a few days, if the patches are caused by pink patch, pink tufts resembling cotton candy will appear on the infected grass blades.

Increasing the amount of nitrogen will help reduce the severity of pink patch. No fungicide data exists for the management of this disease. If it becomes a problem, you may wish to try one of the fungicides recommended for red thread. **WT&T**

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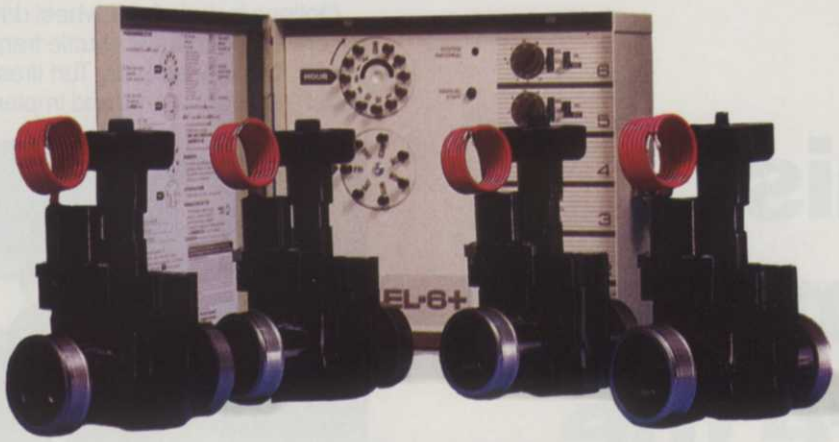

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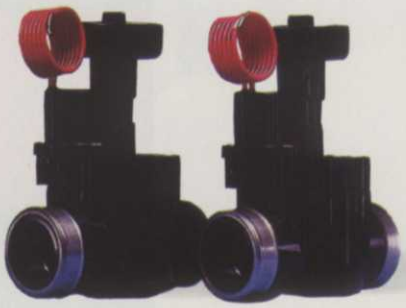

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There are six models, from 13 to 32 engine horsepower. These hard-working diesels come standard with 540 rpm PTO, 10 or 12-speed transmission, full-time live hydraulics, and a Category I three-point hitch.

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Ford commercial mowers

These mowers are designed for grounds maintenance professionals with sunup to sundown work schedules.

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For mowing and trimming smaller areas, Ford offers two rear-discharge 21-inch commercial mowers, one self-propelled and one push-type.

Ford mid-range tractors

Ford Series 10 tractors are engineered for excellent performance, ease of operation and all-around versatility.

Choose from ten diesel models from 34.3 to 86 maximum net engine horsepower. Standard equipment includes 3-point hitch, independent PTO, and power-assist steering on most models.

Options include front-wheel drive, synchromesh transmission, turf tires, and more.

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Ford tractor-loaders

There's a Ford loader available to extend the versatility and year-around capabilities of every Ford tractor power size. Each offers a wide choice of buckets.

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FORD TRACTORS

Ford

Circle No. 119 on Reader Inquiry Card

DISEASES OF WARM SEASON TURF

by Don Blasingame, extension plant pathologist, Mississippi State University

Managers of southern turf not only fight diseases of six different warm season turf species, but also diseases of overseeded cool season turf species.

Although most southern turf diseases are caused by fungi, agents such as bacteria, viruses, and nematodes, can cause serious problems to certain grasses.

Southern turf managers can't depend solely on fungicides for disease control. Good variety selection, proper fertilization, and appropriate cultural practices are very important in disease control.

No amount of fungicide will compensate for poor fertility and cultural practices.

Brown patch

Brown patch is the most common turf diseases occurring in the Southeast. Although St. Augustine and zoysiagrass are the most susceptible species, even the more tolerant centipedegrass, bermudagrass and ryegrass are frequently damaged by this fungus.

Brown patch is favored by warm, moist weather combined with cool nighttime temperatures. Therefore, in certain areas of the South, brown patch can and does occur any month of the year.

In the upper regions of the South, the most favorable conditions for brown patch development occur from late April through mid-October.

Symptoms of brown patch on warm season grasses are different than the symptoms of the disease on cool season turf. Even though the grass is usually killed in a circular pattern, many times the smoke ring is not seen on southern turf.

Under certain conditions the fungus may cause a gradual thinning of the turf over a rather large area instead of killing in a circular pattern.

There are several factors that tend to make the grass more susceptible to brown patch. One is the excessive ap-

continued on page 70

A developed case of fairy ring on centipede grass.

Rust on zoysiagrass.

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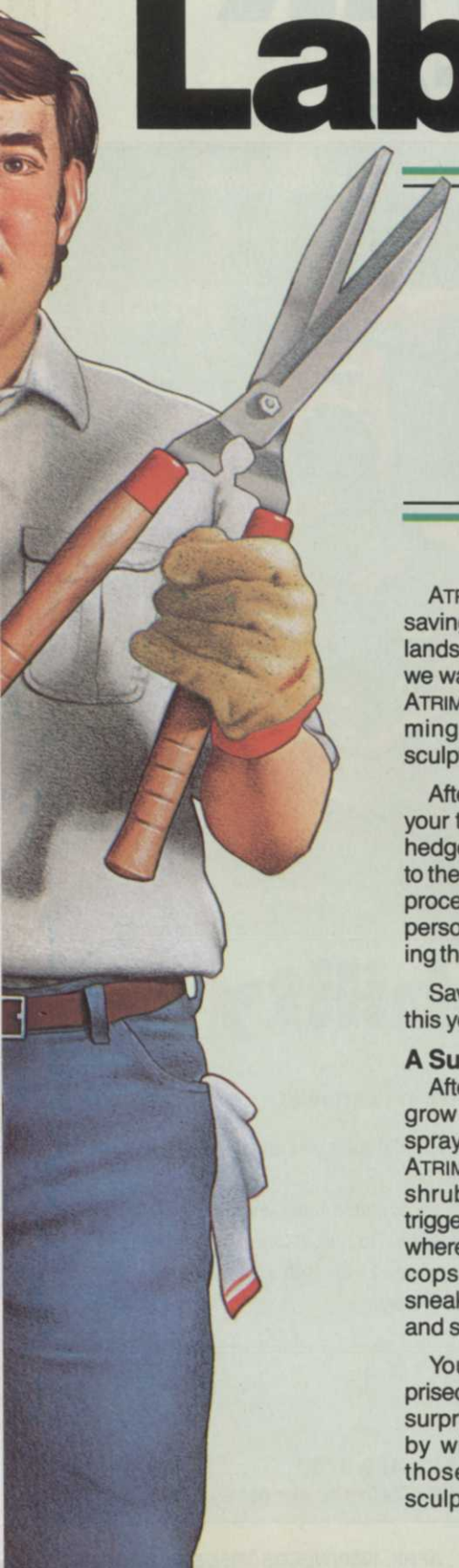
Cut Trimming Labor Costs



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After the spring flush of growth, take out your trusty shears and go after the shrubs, hedges, groundcovers, etc. Shape them up to the zenith of their appearance, and in the process be sure to savor every moment of personal satisfaction you get from beautifying the landscape with your own two hands.

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It is also efficient for chemically pinching azaleas, fuchsias, kalanchoe, crepe myrtle, shrimp plant, English ivy and other potted or hanging plants. (See chart on opposite page.)

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ATRIMMEC, by injection, retards the growth of larger trees and thus reduces the need for manual pruning under utility lines. In some instances, ATRIMMEC can eliminate trimming for up to four years.

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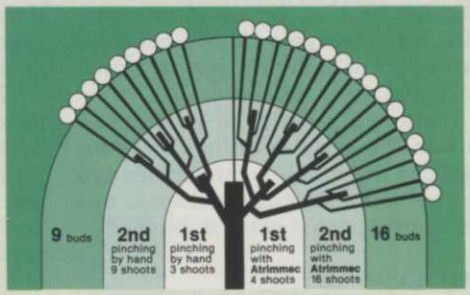

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Spray on ornamentals and hedges to prolong a sculptured look.

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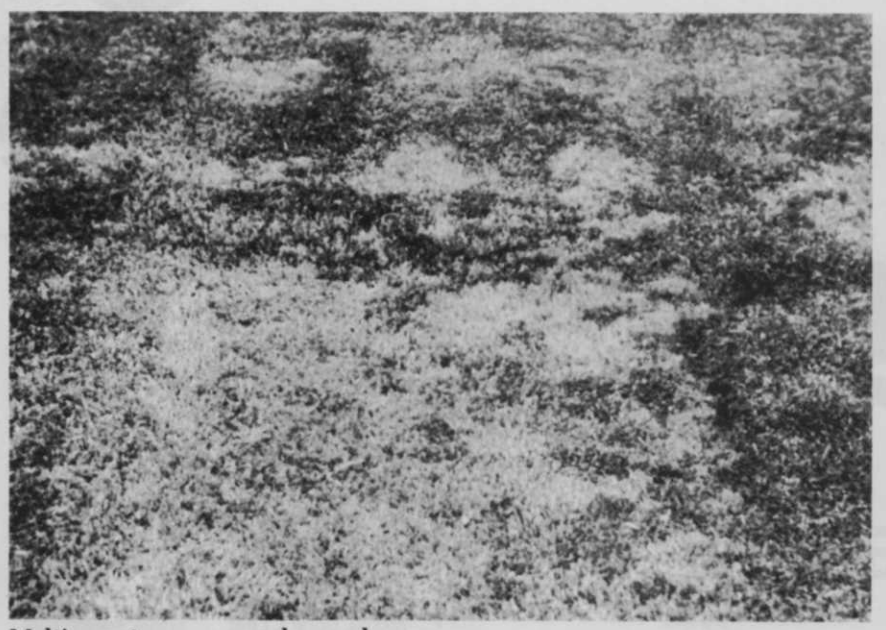

Melting out on common bermudagrass.

plication of nitrogen fertilizer. The resulting lush growth is readily attacked.

Another is watering late in the afternoon and allowing the grass to remain wet for long periods of time. Excessive accumulation of thatch also creates a favorable environment for development of brown patch and many other diseases.

Fungicides are best used on a preventative schedule. Once symptoms develop, control can be difficult.

Dollar spot

Dollar spot is common on many species of grasses, including bermudagrass, zoysiagrass, and annual and perennial bluegrasses.

Symptoms of dollar spot are different on certain warm season grasses than those noted on cool season grasses.

On finer textured grasses, such as bermudagrass and zoysiagrass, the disease kills grass in small patches two to three inches in diameter. Under severe conditions, these patches may coalesce so that the turf has a mottled appearance. Blades of grass at the outer edges of the infected area develop tan spots with reddish brown margins.

On coarser warm season grasses, turf is killed in larger patches ranging up to a foot in diameter.

Dollar spot is prevalent during periods of mild weather during the spring and fall.

Unlike brown patch, dollar spot is retarded by high levels of nitrogen. Still, turf managers should consider the impact of high nitrogen on brown patch and other diseases.

Watering should be performed only in the early morning so the foliage can dry quickly. Fungicides can be used to help bring the disease under control once it gets established.

Leaf spots

A number of fungi cause leaf spots on many southern grasses. Regardless of the causal agent, leaf spots and their control on southern grasses are similar.

Helminthosporium leaf spots (*Bipolaris* spp.)—Bermudagrass and ryegrass are most severely affected by helminthosporium infections, although the fungus can survive on centipedegrass and St. Augustine.

Infection can occur over a wide range of temperature, but usually is more severe at 70 to 95 degrees F. Milder temperatures in the spring and fall are more favorable for infection.

Helminthosporium causes small, dark-colored spots or flecks on the leaves and sheaths. Leaf spots are usually more numerous near the collar of the leaf blades. Severely affected leaves wither and die and the turf frequently becomes brown and thin.

Symptoms on overseeded ryegrass are altogether different. Although leaf spots may occur, this same helminthosporium can cause severe crown rot. This causes a yellowing and discoloration of the grass and a general thinning of the turf.

Fertilize with adequate levels of nitrogen and potassium if helminthosporium diseases become a problem. With careful management, apply fungicides recommended for helminthosporium blight control.

Gray leaf spots—St. Augustine is the primary host for gray leaf spot. The disease occurs throughout the lower South during warm, humid weather.

Spots on the leaf blades are the most visible, but sheath and stem lesions also occur. Leaf spots begin as olive green to brown, water-soaked spots as small as a pinhead. These enlarge rapidly and form a circular to elongate lesion that is brown to ash colored with purple margins.

The disease occurs during moderate to warm weather accompanied by high relative humidity. Severity of the disease is enhanced by applications of nitrogen fertilizer. It is more a problem in shaded areas where the grass remains wet from dew.

Treatment with a fungicide may become necessary if the disease outbreak is severe and accompanied by prolonged periods of wet favorable weather.

The fungicides chlorothalonil, mancozeb, and cycloheximide plus thiram have been found to be effective in controlling gray leaf spot.

Rust

Rust or *Puccinia* species infect a number of grasses grown in the South, including ryegrass, zoysiagrass, bluegrass, fescue, bermudagrass, and St. Augustine.

Zoysiagrass and bluegrass are the most often infected grasses.

Susceptibility depends on the variety. Fungus infection is favored by minimum and maximum temperatures of 50 to 70 degrees F. respectively. For this reason, the disease does not usually cause severe damage over an extended period. It is likely to be more severe in shaded areas during rainy, humid weather. Affected turf will appear unthrifty and begin to thin.

The disease is characterized by the presence of pustules on the leaf blades. These pustules range from bright orange to cinnamon-brown in color depending upon the species of fungus present.

continued on page 75

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years of use. Even on courses where Daconil 2787 was applied at weekly intervals for many seasons. Convincing proof that you don't have to alternate sprays to avoid developing resistance to Daconil 2787.

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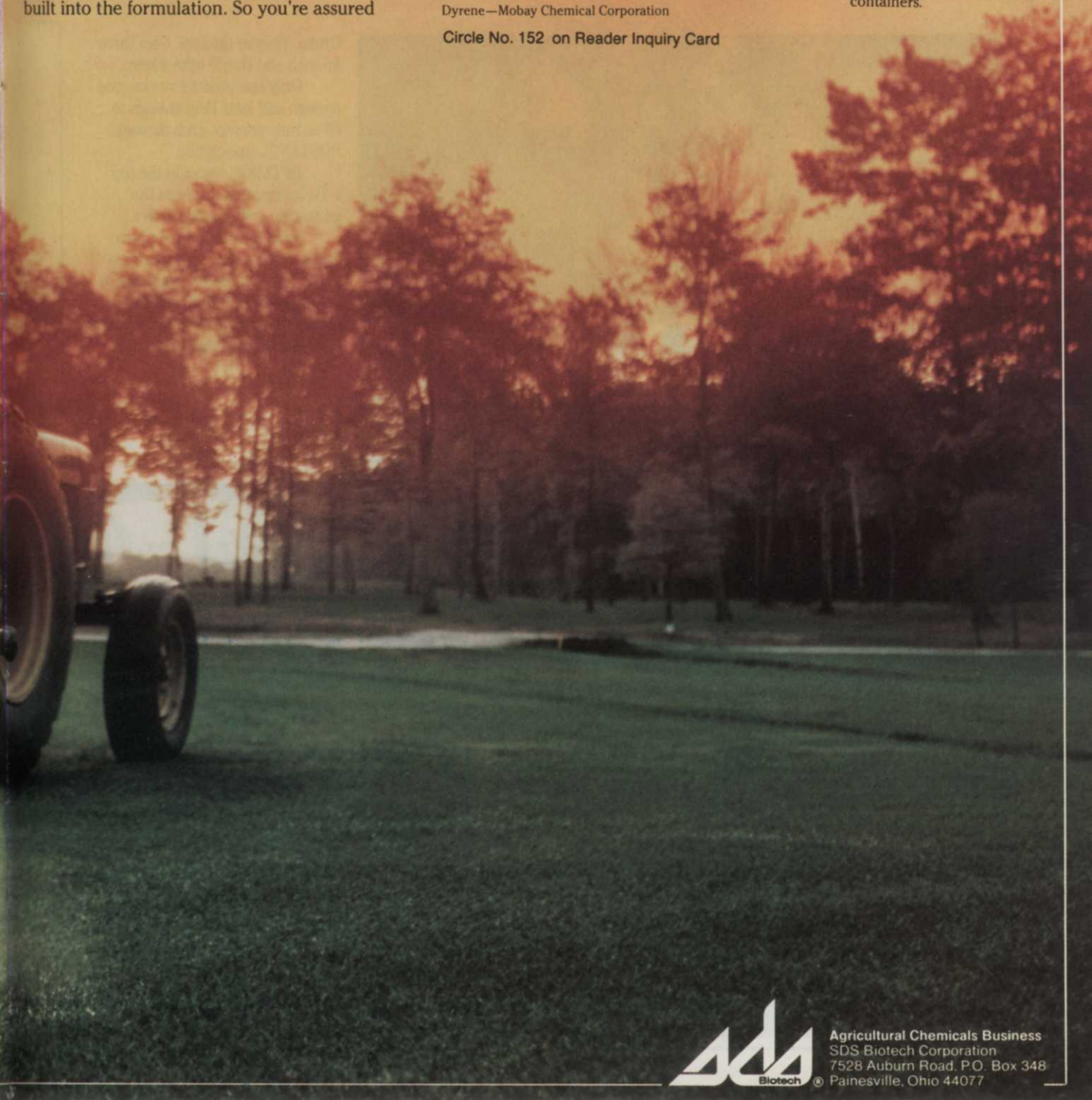

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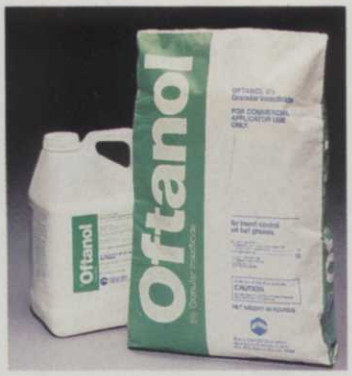

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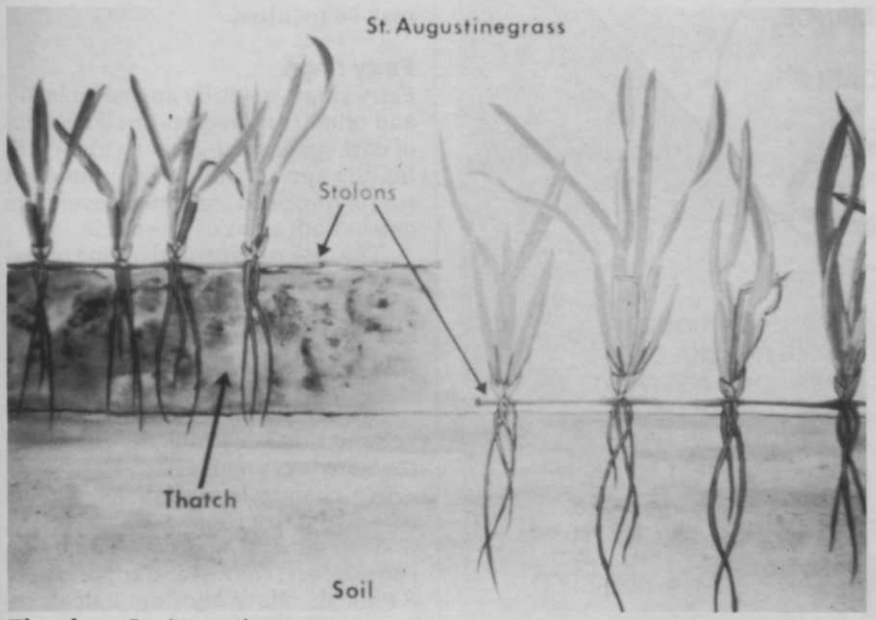

Thatch on St. Augustine grass.

Certain varieties of ryegrass are extremely susceptible to rust, and sometimes severe damage can occur. Zoysiagrass, especially Meyer and Emerald, are most severely infected by rust.

Fertilize to stimulate grass growth, mow on a four- to five-day schedule, and catch clippings. If necessary, a fungicide may be applied to help reduce the amount of disease present.

Triadimefon, chlorothalonil, mancozeb, and cycloheximide are effective in controlling rust.

Spring dead spot

Spring dead spot is a serious disease of bermudagrass in certain parts of the upper Sunbelt. It is found generally on bermudagrass or zoysiagrass under high maintenance.

Damage to the turf apparently occurs during the dormant season. When greenup occurs in the spring, areas a few inches to several feet in diameter appear where the sod is completely dead.

Spring dead spot's causal agent has not been identified. The only control procedures recommended are good cultural practices and limiting the use of nitrogen fertilizer, especially late in the growing season.

Research has shown that fungicides can limit the damage. However, at the present time only Benomyl and PCNB are labeled, and these may be limited uses in certain states.

St. Augustine decline

St. Augustine decline (SAD) is caused by a virus. The symptoms are a mosaic- type chlorosis of the leaf blades that resemble nutrient deficiency or mite feeding. Evidently there are several strains of the virus since there is a great range in damage to St. Augustine.

To this point, the disease has only been recorded in Arkansas, Texas, Louisiana, and Mississippi. No chemicals are available for the control of SAD.

Fungicides are best used on a preventative schedule. Once symptoms develop control can be difficult.

Several varieties of St. Augustine, however, are resistant to the virus. These can be planted in areas where the disease is a potential problem.

Floratam was the first variety release with resistance to SAD. It is also resistant to chinch bugs. It has poor cold tolerance and should be used only in the lower South.

Seville is resistant to SAD and is more shade tolerant than common St. Augustine. Raleigh has both SAD resistance and good winter hardiness.

Downy mildew

Downy mildew of St. Augustine was first described on common St. Augustine in Texas in 1969. Since then the disease has spread and has been identified in Arkansas, Louisiana, and Mississippi.

Downy mildew appears as white, raised, linear streaks that develop parallel to the mid-veins of the leaf. Streaks appear in the spring and remain throughout the summer, giving the leaves a yellow appearance with some death toward the tips.

Severe disease occurs in grass grown in flood plains or poorly drained areas.

The white-streak symptom is easily confused with the virus disease, St. Augustine decline. However, the virus symptoms are more yellow in color and more mottled than striped.

Downy mildew has been difficult to control with most common turf fungicides. Good drainage is recommended for cultural control.

Pythium blight

Pythium blight can be a devastating disease on overseeded ryegrasses. Bermudagrass and other warm season grasses can be affected to a lesser degree.

An abundance of moisture is required for pythium blight development. In addition, the disease is favored by warm temperatures.

Affected grass is killed rapidly in spots 2-4 inches in diameter. These spots may develop into streaks so that large areas of turf are damaged.

During early stages of development, the affected grass appears wilted and greasy. At times the affected turf spots may have a cottony appearance due to the abundant growth of the fungus. For this reason, the disease is frequently referred to as cottony blight.

Certain species of pythium can also cause root rot on turfgrasses. Due to the restricted root function, the plants become chlorotic and the turf begins to thin.

On overseeded grasses the disease can be limited by using treated seed and delaying the overseeding until as late as possible during the fall. Water as little as possible during periods of favorable activity. The perennial ryegrasses are not as susceptible as annual. Under severe disease pressure, chemical control

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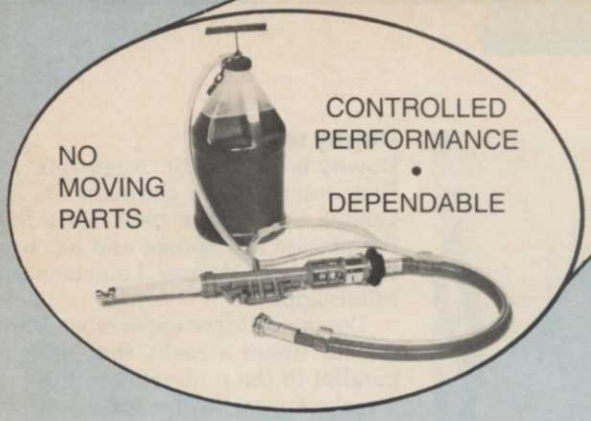

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may be required.

Fairy rings

Fairy rings generally appear in lawns and other turf areas as circles or arcs of dark green, fast-growing grass during the spring and early summer. A ring of thin dead grass may develop on one or both sides of this circle.

The disease is caused by one of several soil-inhabiting fungi that commonly produce mushrooms. Mushrooms that sometimes appear in the ring are the fruiting bodies of these fungi. Stimulation of the grass is due to the release of nutrients from the organic breakdown of the thatch by the growing fungus.

No chemicals are labeled for the control of fairy ring.

Two general approaches may be considered: removal and suppression. Although relatively impractical, removal of infected soil and grass to a depth of 12 inches or more in a band several feet on each side of the infected area and replacement with clean soil is one solution.

Another approach is to suppress the disease. For low maintenance grass areas, increase the water and fertilization program to stimulate the declining grass inside the ring. Symptoms of fairy ring can be masked by pumping large quantities of water into this area.

Slime molds

Slime molds are a group of organisms that cover above-ground plant parts with a dusty gray-black or dirty yellow mass.

When you look closely at this growth, you see small round balls scattered over the plant. If you rub these between your fingers, a sooty powder emerges. This consists of spores of the fungus.

Slime molds normally live in soil where they feed on decaying organic matter. When the mold is ready to reproduce, it grows up on to the grass blades so that the spores may be spread greater distances.

Slime molds do not feed on living plants. They only use them to assist in the distribution of spores during reproduction.

Slime molds occur during wet weather throughout the spring, summer and fall. They disappear rapidly as soon as it becomes dry. Chemical control is usually not necessary.

WT&T

Frank J. McDonald, Director of Marketing
Cushman Division, Outboard Marine Corporation
Lincoln, Nebraska

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A NATURAL CARPET

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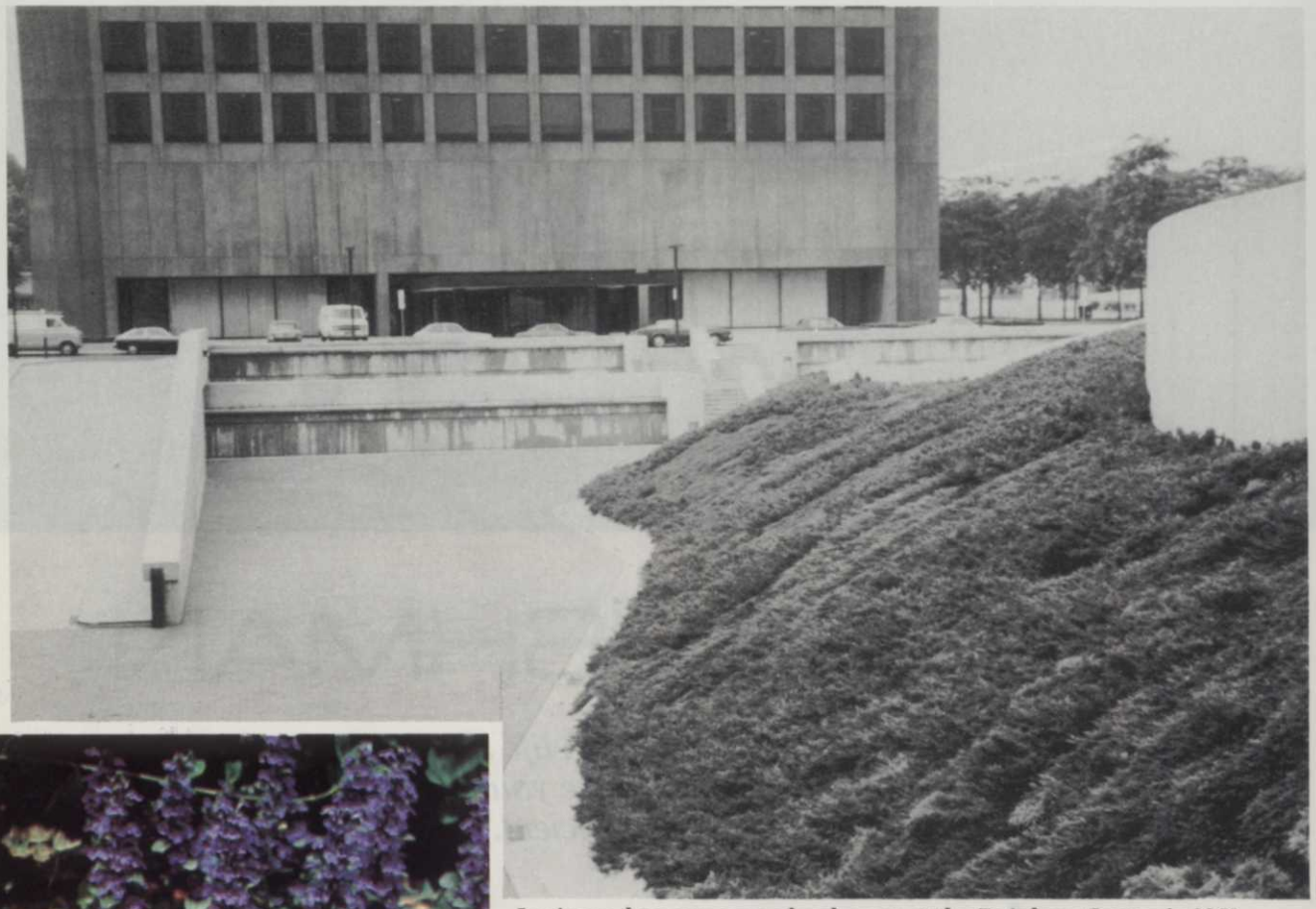

Junipers decorate an embankment at the Rainbow Center in N.Y. At left, ajuga reptans feature an attractive purple flower.

by Ann Reilly, Bedding Plants Inc.

Every landscape manager is faced with the maintenance of problem areas.

One answer might be the use of ground covers. They're beneficial wherever a uniform, growing carpet is needed without having to cope with the maintenance of turfgrass.

These could be areas where turfgrasses are difficult to maintain because of low light, steep slopes, poor soil, or where turfgrass won't grow well.

Ground covers are low-growing plants that spread quickly to form a dense carpet for outdoor landscaped areas.

This article will deal with both woody plants and perennials (herbaceous plants) and their uses as ground covers.

Some annual plants are also useful as ground covers where temporary color or a different look each season is needed. The best of these will be listed later on.

The main difference in choosing between woody plants and perennials is one of choice; most perennials die in the winter, leaving bare spaces, while

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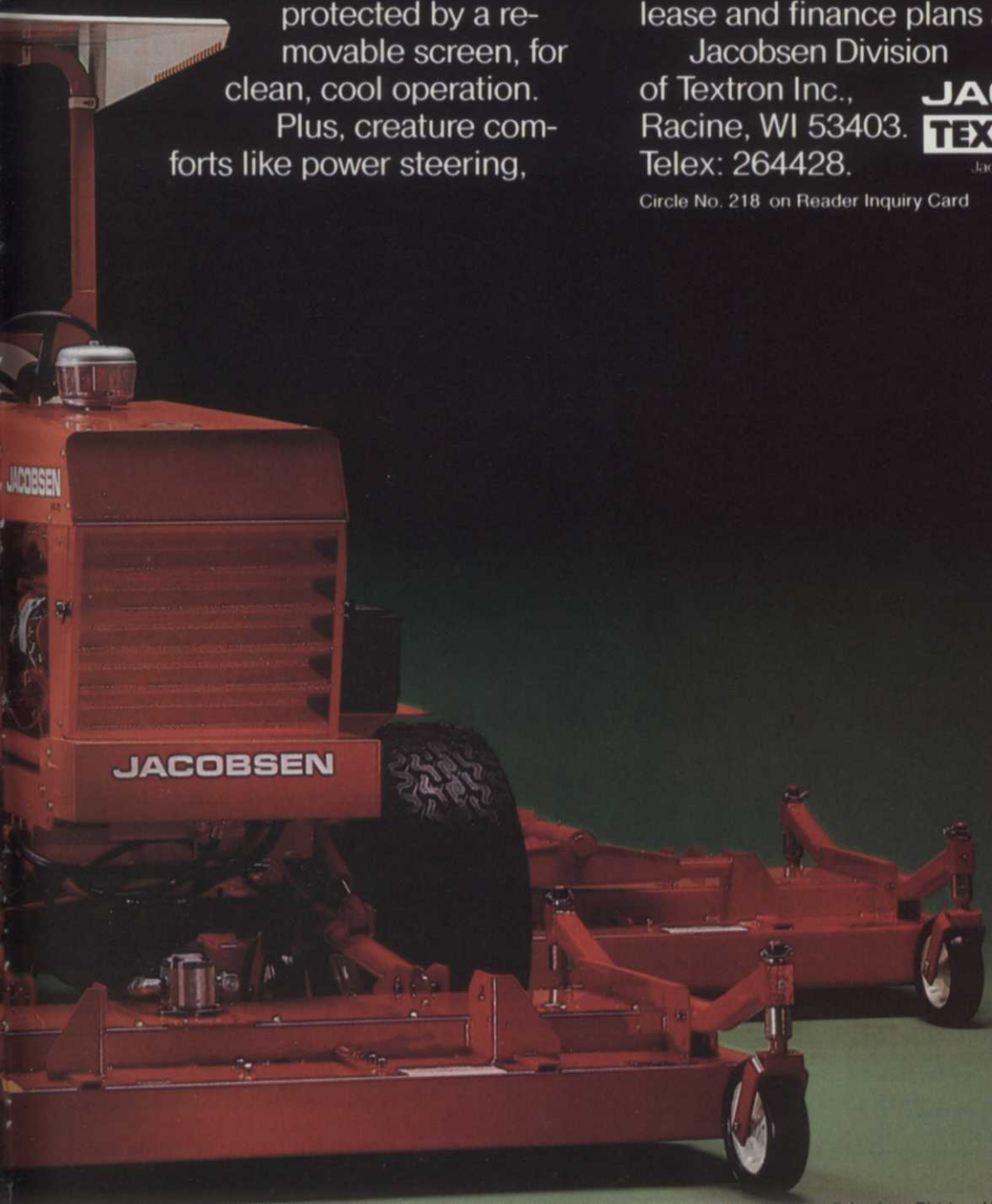


Ground Cover Characteristics-*Characteristics of each ground cover are listed in common name category. Each number listed corresponds to a particular trait below.*

Scientific name	Common name	Height	Characteristics
Aegopodium podograria	Goutweed 1,2,4,8	14″	White flowers-June
Ajuga reptans	Carpet bugle 1,4,5	3-6″	Blue flowers-May colored foliage
Arctostaphylos uva-ursi	Bearberry 2,5,6,8,9,10	4″	Red fall foliage and berries
Armeria maritima	Thrift 4,5,6,10	6-12″	Pink flowers-May
Asperula odorata	Sweet woodruff 1,3	8″	White flowers-May
Arenaria verna	Moss sandwort 1,4,5,6	2″	White flower-May
Aurinia saxatilis	Alyssum 9	6″	Gold flowers-April
Calluna vulgaris	Heather 2,6,7,9	10″	Mixed flowers-summer
Cerastium tomentosum	Snow-in-summer 3,5,10	6″	White flowers-June silver foliage
Convallaria majalis	Lily-of-the-valley 1,4,5,8	6″	White flowers-May fragrant
Cotoneaster horizontalis	Rock-spray coton. 6,8	36″	Red fall berries
Cytisue species	Broom 2,8,10	18″	Yellow flowers-June
Epimedium species	Epimedium 1,7	9″	Pink & yellow flower May
Erica carnea	Heath 2,6,7	12″	Pink & white flowers March
Euonymus fortunei	Wintercreeper 1,4,5,6,7,9	3″	Colored foliage
Festuca ovina	Ornamental fescue 2	18″	Blue foliage
Hedera helix	English ivy 1,4,5,6,8,9	3″	
Hemerocallis species	Daylily 1,2,3,9	18″	Varied flowers summer
Hosta species	Hosta, funkia 1,2,8,9	12″	Violet flowers-June unique foliage

1. *SHADE* Plants for low light conditions.
2. *DRY SOIL* Plants for poor, dry soil. These will generally become pests where growing conditions are good, so use them with caution.
3. *WET SOIL* Plants that will tolerate wet conditions and poor drainage.
4. *RAPID INCREASE* When funds are slim, time is tight and space is large, use plants that will grow rapidly and cover the ground in short period of time.
5. *LOW GROWERS* Plants for neatly trimmed areas close to buildings.
6. *EVERGREENS* Most desirable as they supply a green cover over the ground the entire year.
7. *HIGH MAINTENANCE* These will require extra care, such as trimming or pruning, so be prepared.
8. *LOW MAINTENANCE* Plants requiring little attention.
9. *FOR SLOPES* Those with a heavy root systems that will hold soil in place.
10. *FOR THE SEASHORE* Plants that will tolerate salt air.

woody plants will naturally be in evidence.

Improved landscapes

Ground covers reduce maintenance while improving the landscape. Besides replacing turfgrass, they can be used on steep slopes to prevent erosion and eliminate mowing.

Small areas and wet locations where mowing is difficult, areas beneath shade trees, wooded areas, and spots with rock outcroppings are also suited to ground covers.

Ground covers play a large role in landscape design. Present day landscaping stresses simplicity. A few carefully selected plants may be widely spaced to create an interesting landscape, tied together as a unit by ground covers. The ground cover forms a green, horizontal mass that serves as a base or platform to trees and shrubs.

Spacing depends on the type of plant, its size, and how quickly it will spread.

Ground cover can tie together the manicured and the informal, the mature and the newly-planted, and the various segments of the landscape.

Since ground covers discourage foot traffic, they can be used to direct the flow of pedestrians in and out of buildings or through parking areas. Some low-growing ground covers, such as sandwort, thrift, pearlwort, and thyme will even grow well between steppingstones, eliminating the need for weeding.

Selection criteria

When choosing ground covers, there are several items to consider—light, soil requirements, and desired maintenance levels to name a few.

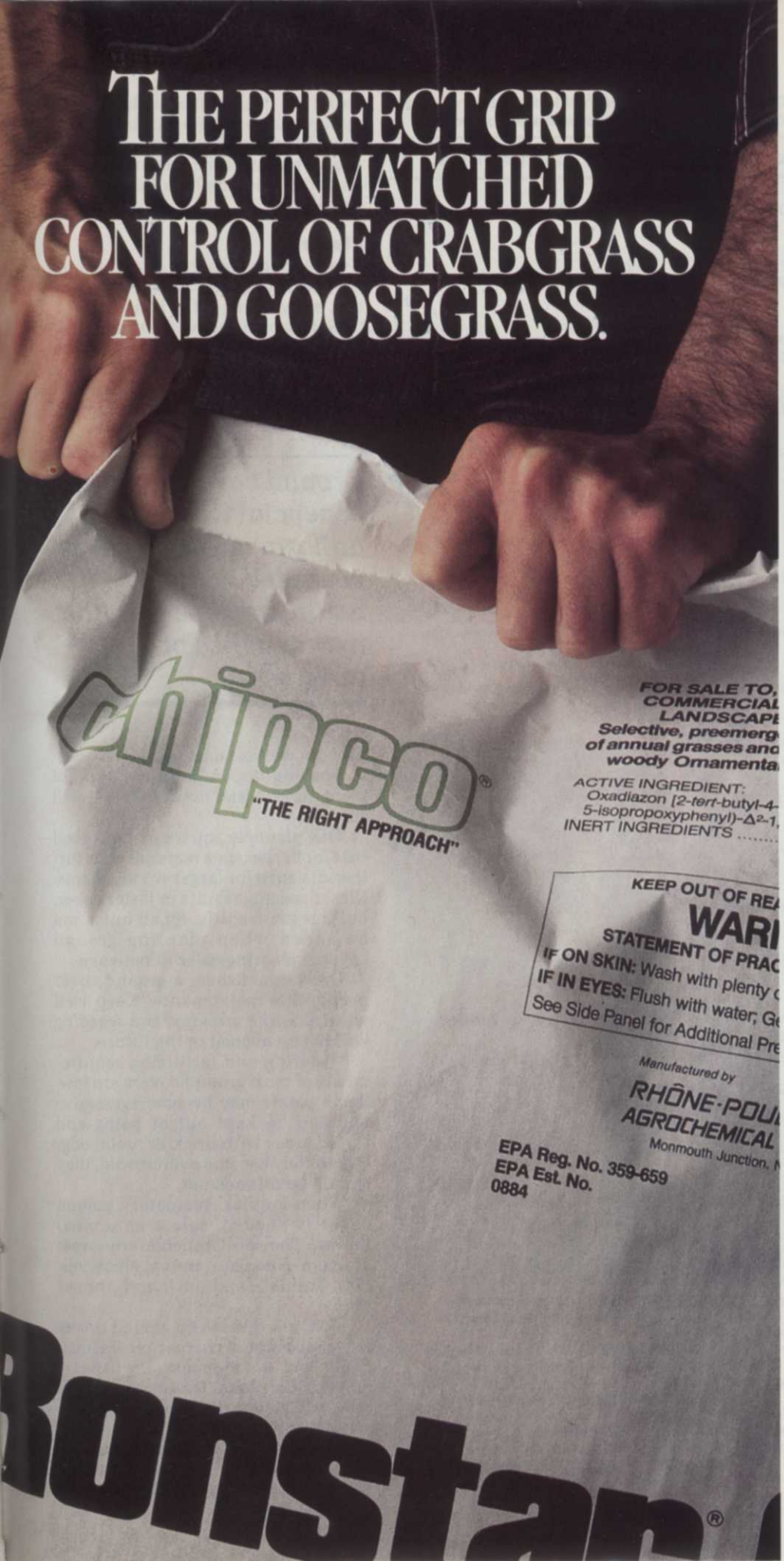
Don't overlook foliage, for some are unusually colored and add certain highlights. These could include bronze or green-leaved ajuga, blue festuca, silver snow in summer, or purple wintercreeper.

Flowers-white candytuft, gold alyssum, pink creeping phlox, and blue ajuga-add needed color to the landscape.

Boston creeper has brilliant fall color, and cotoneaster has a fine display of berries.

The accompanying table outlines the characteristics of the most popular of the ground covers.

It may aid you in choosing plants



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Ground Cover Characteristics-*Characteristics of each ground cover are listed in common name category. Each number listed corresponds to a particular trait below.*

Scientific name	Common name	Height	Characteristics
Iberis sempervirens	Candytuft 6,8	12″	White flowers-May
Juniperus chinensis sargenti	Sargent juniper 2,5,6,8,9	6-12″	
Juniperus conferta	Shore juniper 2,6,8,9,10	6-12″	
Juniperus horizontalis	Creeping juniper 2,6,8,9,10	6-12″	
Lamium species	Lamium, Nettle 1,2,4,5	6″	Yellow & pink flower colored foliage
Liriope spicata	Liriope 1,4,6,8	8″	Purple & white flowers variegated foliage
Mesembryanthemum	Ice plant 2,4,5,9	6″	Varied flowers spring & summer
Lysimachia nummularia	Moneywort 1,3,4,5	2″	Yellow flowers-June
Myosotis scorpioides	Forget-me-not 3,5	4″	Blue flowers-May
Pachysandra terminalis	Pachysandra, spurge 1,4,5,7,9	6″	Insignificant flower
Phlox subulata	Creeping phlox 5,8	6″	Pink flowers-May
Sagina subulata	Pearlwort 1,5,6	4″	White flowers-summer
Saponaria ocymoides	Soapwort 1,2,5,8	3″	Pink flowers-summer
Sedum species	Stonecrop 3,4,5,7,9	5″	Varied-spring & summer
Thymus vulgaris & serpyllum	Thyme, Mother of Thyme 5,6	2″	Rose flowers-May
Tiarella cordifolia	Foamflower 1,2,4	8″	White flowers-May
Veronica officinalis	Speedwell 1,4,5,8	4″	Blue flowers-summer
Vinca minor	Periwinkle, myrtle 1,4,5,6,8,9	3″	Lavender flowers-May

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2. *DRY SOIL* Plants for poor, dry soil. These will generally become pests where growing conditions are good, so use them with caution.
3. *WET SOIL* Plants that will tolerate wet conditions and poor drainage.
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10. *FOR THE SEASHORE* Plants that will tolerate salt air.

based on their height, light requirements, soil preference, quick cover capabilities, maintenance, use, evergreen characteristics, and special characteristics such as flowers, fruit or foliage.

Planting

Even though you can plant ground covers throughout the growing season, early spring is the ideal time.

Spring plantings will be well established by winter, which will help protect them from freezing and thawing. Steep banks should be mulched with salt hay or straw until the ground cover is well established.

Ground covers are beneficial wherever a uniform, growing carpet is needed without having to cope with the maintenance of turfgrass.

Spacing depends on the type of plant, its size, and how quickly it will spread.

One plant per square foot is a good rule for herbaceous material with further distance for larger woody plants. Closer spacing results in faster cover, but it is more costly. Small bulbs can be added when planting ground covers for spring color in between.

Once established, a ground cover needs little maintenance. Keep well weeded while growing, and weeding will not be needed in the future.

Watering and fertilizing requirements of most ground covers are low. Some plants may become aggressive and can be kept out of paths and turfed areas with brick or metal edgings. If they become overcrowed, they should be thinned out.

When a quick, temporary ground cover is needed, select an annual flower. The most reliable are sweet alyssum, portulaca, annual vinca, lobelia, annual candytuft, and annual phlox.

More information on ground covers is available free of charge from Bedding Plants Inc., a non-profit trade association that distributes information on the selection, planting, and care of annuals and perennials.

For your copy, send a self addressed, stamped envelope to Ground Covers, 210 Cartwright Boulevard, Suite W, Massapequa Park, NY 11762. **WT&T**

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Circle No. 136 on Reader Inquiry Card

THE PATCH DISEASES

At least 17 exist and the symptoms of some are similar. A positive identification is necessary for control and treatment.

by Dr. Houston Couch, Virginia Polytechnic Institute and State University

Corticium red thread of Manhattan ryegrass.

Bentgrass infected with take-all patch.

Necrotic ring spot of Kentucky bluegrass.

Rhizoctonia yellow patch of Kentucky bluegrass.

Turfgrass "patch" diseases are among the most difficult to diagnose.

The classic patch symptom pattern is characterized by the blighting of the majority of the leaves of the plants in a section of otherwise green turf.

Dr. Houston Couch is professor of plant pathology in the Dept. of Plant Pathology, Physiology, and Weed Science at the Virginia Polytechnic Institute and State University in Blacksburg, Va.

At present, there are 17 known patch diseases of turfgrasses. Various members of this disease group occur throughout the year on both warm- and cool-season grasses (see Table 1).

All of the complexities of diagnosis are highlighted within this group of diseases.

For example, some of the more dramatic symptoms associated with certain patch diseases can also be brought on by a variety of causes other than the pathogenic activity of microorganisms.

Plant stress caused by extremes in air temperatures, deficient or excessive soil moisture levels, improper mowing, or improper fertilization practices can also result in a browning of turfgrass in irregularly shaped patches.

In addition, the primary field diagnostic features for many of the patch diseases closely resemble each other. One symptom pattern, the "frog-eye" effect, is common to several of these diseases. It is roughly a circular area of blighted grass with a center of green, apparently healthy plants.

continued on page 90

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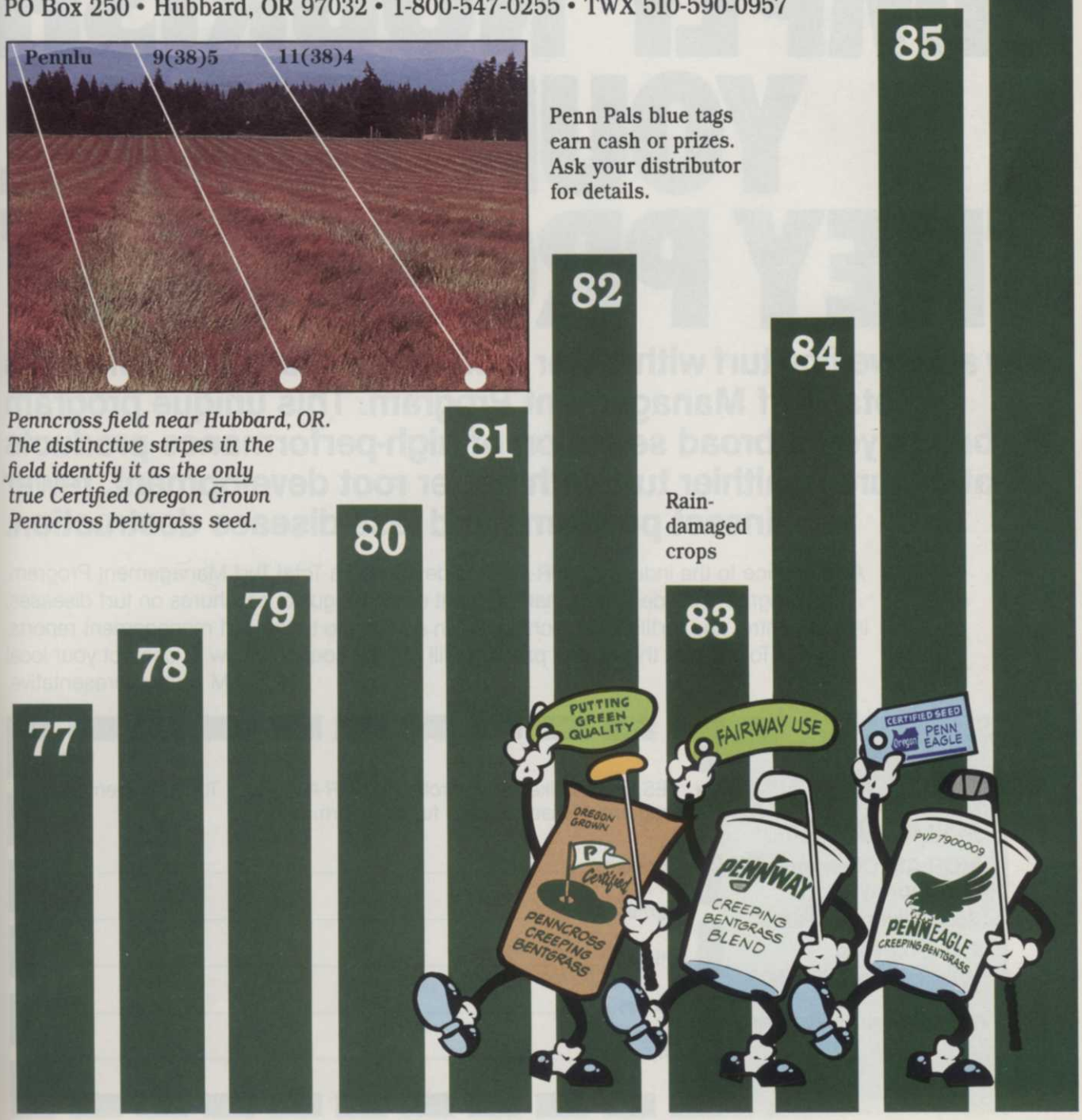

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SPRING PATCHES, *from page 86*

At present, nine patch diseases are known to be capable of producing this type of symptom: spring dead spot of bermudagrass; fusarium patch; rhizoctonia yellow patch; necrotic ring spot; take all patch; pythium blight; fusarium blight; rhizoctonia blight, and sclerotium blight.

At times, a positive diagnosis of a patch disease can only be made after there has been a thorough review of the environmental conditions preceeding problem development, an evaluation of the current management program for the grass (including mowing practices, fertilization rates and dates, watering practices, and the record of pesticide application), and a series of laboratory-based tests on diseased plant tissue and soil samples collected from the affected area.

In order to be successful in on-site identification of patch diseases, the identifier must:

1. Know what diseases could be occurring in the stand of grass at the time in question;
2. Be familiar with all of the primary and secondary field symptoms of each of these diseases;
3. Be able to recognize the particular field symptom patterns unique to each disease.

In this article we will review the key diagnostic features of the spring patch diseases of turfgrasses, highlight the weather and management conditions that favor their development, and give the control practices for each.

Necrotic ring spot

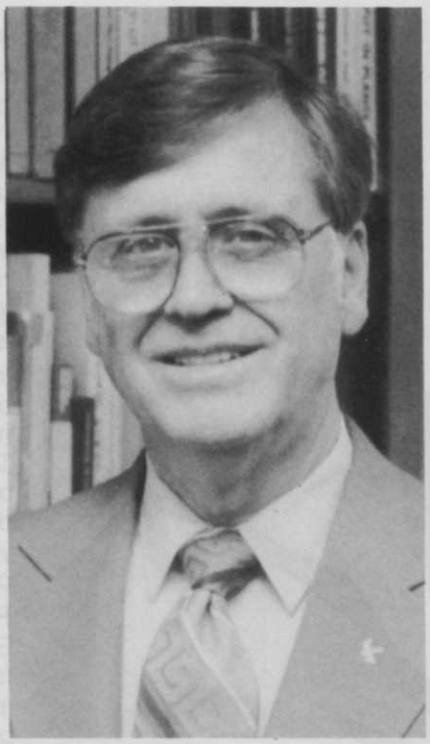
Necrotic ring spot is a newly recognized disease of turfgrass in North America, reported from the Pacific northwest, northeast, and north central sections of the U.S.

This disease is particularly destructive to Kentucky bluegrass and bentgrass, but also affects ryegrass, red fescue, tall fescue, and chewings fescue.

In the early stages of disease development, necrotic ring spot is seen as irregular patches of grass that have a general appearence of drought injury. The plants are often stunted or discolored, turning various shades of red, yellow or tan. These areas become dull tan to brown as the disease progresses.

The individual areas of dead grass are usually more or less circular in outline, and may range from a few inches to several feet in diameter.

When these patches first develop, the extent of leaf blighting within them is usually universal. However, many of the affected areas soon assume a distinctive "frog-eye" appearance.



Dr. Houston Couch

One symptom pattern, the 'frog-eye' effect, is common to several of these diseases. It is roughly a circular area of blighted grass with a center of green, apparently healthy plants.

At times, the initial sites of disease may coalesce to form large, irregularly-shaped zones of blighted grass.

Under weather conditions favorable for necrotic ring spot, reddish-brown borders may develop between the patches of dead plants and the adjacent healthy grass.

Also, the thatch may decompose rapidly in the patch areas, leaving depressions that give a "sunken pocket" appearence to the turf.

Necrotic ring spot is incited by *Leptosphaeria korrae*. Laboratory examination of the diseased plants reveal the dark brown strands (mycelium) of the fungus growing over the surface of the crowns and roots.

This can be a valuable aid to diagnosis, but must be used with some caution, for the fungus that incites take-all patch also produces similar structures on the root and crown surfaces.

Development of necrotic ring spot generally occurs during the cool, wet weather of spring and fall. During April and May, heavy outbreaks of the disease have been noted after prolonged periods of rainfall.

Field research reports from Washington and Wisconsin indicate that Chipco 26019 and Banner provide good control of necrotic ring spot, while Bayleton has been found to be ineffective in controlling the disease.

Take-all patch

Take-all patch (ophiobolus patch) affects Kentucky bluegrass, ryegrass, red fescue, tall fescue, and bentgrass. It is generally considered to be only a serious problem in bentgrasses.

New outbreaks, usually appearing in late spring, are characterized by dead spots of grass a few inches in diameter. Initially, under stress conditions, the leaves of affected plants may range in color from bronze to a bright reddish brown. Eventually, they fade to a light tan.

In time, these areas may increase to two feet or more in width, and develop "frog-eye" patterns as the centers are invaded by the more resistant grass species.

Ultimately, the roots of affected plants will rot. Therefore, during the final stage of disease development, the plants are easily pulled loose from the soil.

Outbreaks of take-all patch are most severe during periods of prolonged rainfall. The disease will usually first appear along drainage slopes, in low areas, or in locations where there has been excessive irrigation.

Although initial outbreaks usually occur during cool, moist growing conditions, often times the overall symptoms will continue to increase in severity during periods of stress from hot, dry weather.

Take-all patch is more severe when the soil is alkaline. The disease will be more prevalent on grass growing in soils that are light-textured, low in organic matter, or low or unbalanced with respect to nitrogen, phosphorous, and potassium.

Take-all patch is most severe on bentgrass that has been seeded on recently-fumigated soil.

Take-all patch is incited by *Gaeumannomyces graminis* var. *avenae*. This fungus produces dark brown thread-like strands (mycelium) on the surface of the diseased roots and lower leaf sheaths, serving as an aid in laboratory diagnosis. One must distinguish it from similar structures produced by the fungus that

continued on page 96

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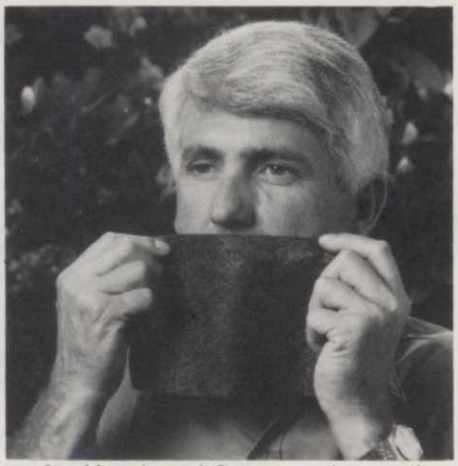

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TABLE 1

Patch Diseases of Turfgrasses

Disease and Season of Occurrence	Susceptible Grasses	Incitant
I. WINTER		
Spring Dead Spot	Bermudagrass	*Leptosphaeria korrae* in certain areas
Typhula Blight	annual bluegrass, Kentucky bluegrass, perennial ryegrass, red fescue, tall fescue	*Typhula incarnata* *Typhula ishikariensis*
Fusarium Patch	annual bluegrass, bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, ryegrasses, tall fescue	*Fusarium nivale*
Sclerotinia Patch	Kentucky bluegrass, red fescue, perennial ryegrass	*Myriosclerotia borealis*
Winter Crown Rot	creeping bentgrass, Kentucky bluegrass, red fescue, tall fescue	*Coprinus psychromoribidus*
II. SPRING AND FALL		
Necrotic Ring Spot	bentgrasses, Kentucky bluegrass, tall fescue, red fescue, chewings fescue, ryegrasses	*Leptosphaeria korrae*
Take-All Patch (Ophilobolus Patch)	bentgrasses, Kentucky bluegrass, red fescue, tall fescue, ryegrasses	*Gaeumannomyces graminis* var. *avenae*
Rhizoctonia Yellow Patch	creeping bentgrass, Bermudagrass, Kentucky bluegrass, tall fescue, zoysia	*Rhizoctonia cerealis*
Corticium Red Thread	bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, perennial ryegrass	*Laetisaria fuciformis*
Liminomyces Pink Patch	red fescue, perennial ryegrass	*Liminomyces roseipellis*
III. SUMMER		
Fusarium Blight	bentgrasses, Bermudagrass, centipedegrass, Kentucky bluegrass, red fescue, tall fescue, ryegrasses	*Fusarium culmorum* *Fusarium poae*
Sclerotinia Dollar Spot	bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, centipedegrass, zoysia	*Sclerotinia homoeocarpa*
Sclerotium Blight	bentgrasses, Bermudagrass, Kentucky bluegrass.	*Sclerotium rolfsii*
Pythium Blight	bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, tall fescue, ryegrasses, zoysia, St. Augustinegrass	*Pythium ultimum* *Pythium aphanidermatum*
Rhizoctonia Blight (Brown Patch)	bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, tall fescue, ryegrasses, zoysia, St. Augustinegrass	*Rhizoctonia solani*
Melanotus White Patch	tall fescue	*Melanotus phillipsii*
Senescence Syndromes: "Summer Patch"	Kentucky bluegrass	High air temperature stress + *Phialophora graminicola* (?)

MARKETING AND BUDGETING • VALUING A LAWN SERVICE COMPANY
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FACULTY

John Linkhart

Currently the owner/operator of Hart's Lawn Service as well as a senior consultant for AGMA, Linkhart was formerly the V.P. Operations for Perf-A-Lawn. He has been involved in every aspect of operations from both the standpoint of an owner as well as operating his division for a major national company.

Rudd McGary

A senior consultant with AGMA, Dr. McGary was formerly on the marketing faculty at Ohio State. He has been involved with marketing and management in the Lawn Care Industry for eight years, helping design both marketing and management systems for a wide variety of over 50 companies in the industry.

Bob Robinson

Robinson is a senior consultant with AGMA as well as running his own mulch company. Formerly Robinson was in charge of all agronomic programs for Chemlawn, which included both the selection of materials as well as assessing operating costs.

Ed Wandtke

Currently a senior consultant with AGMA, Wandtke was the Corporate Finance Manager for Chemlawn. A CPA, Wandtke works primarily in the areas of finance and accounting for AGMA with a broad-based background in all operating areas of lawn care.

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SPRING PATCHES, *from page 90*

causes necrotic ring spot.

None of the currently available fungicides are effective in controlling take-all patch. The most appropriate approach to dealing with disease outbreaks is to follow management practices designed to promote early recovery of the turf.

Rhizoctonia yellow patch

Rhizoctonia yellow patch, caused by *Rhizoctonia cerealis*, can be destructive to Kentucky bluegrass, but causes only slight to moderate damage to creeping bentgrass, tall fescue, bermudagrass, and zoysiagrass.

In the early stages of disease development, the affected turf develops light green to distinctly yellow-green patches two-to-three inches in diameter. As the disease progresses in Kentucky bluegrass, the color of affected areas fade to a light tan to brown and the size of individual patches may extend up to three feet wide.

...patch diseases can be brought on by a variety of causes other than the pathogenic activity of microorganisms.

With bentgrass, tall fescue, bermudagrass, and zoysiagrass, the color of the patches may remain yellow-green for several weeks, but fail to turn brown. Eventually, these plants may fully recover.

The "frog-eye" symptom pattern of distinct rings of yellow-green to brown grass with center areas of healthy-appearing grass is common for rhizoctonia yellow patch.

These patches often have a pronounced sunken appearance due to the rapid decomposition of the thatch.

Under conditions favorable for development of the disease, the leaves of the plants near the margins of patches will frequently have a characteristic reddish to reddish-purple tint, beginning at the leaf tip and moving progressively toward the sheath.

Another characteristic feature of diseased leaves prior to complete blighting is the presence of tan lesions with dark brown borders.

Considering that many of the field symptoms of rhizoctonia yellow patch and necrotic ring spot overlap and that both diseases can occur in the same location and at the same time of the year, laboratory examination of crowns and roots of diseased plants for the presence of the characteristic rhizoctonia mycelium is advisable.

The development of rhizoctonia yellow patch is favored by cool wet weather, primarily the 40 to 60 degrees F range.

When the leaf symptoms are in the early chlorosis stage of development, symptoms will disappear if temperatures drop below 40 degrees F or go above 75.

However, if the temperatures stay within the 40-60 degree range, the disease will progress to foliar blighting.

Attempts to control this disease with applications of fungicide have met with little success.

Research at Ohio State University has shown that Adelphi, Cheri, and Touchdown Kentucky bluegrasses are highly resistant to rhizoctonia yellow patch.

In the event of severe disease damage, overseeding the affected area with one of these cultivars will provide some protection against major outbreaks.

Corticum red thread

Corticium red thread has the distinction of being the first recorded foliar disease of turfgrass.

The fungus that incites the disease (*Laetisaria fuciformis*) was first observed on ryegrass in Australia in 1854. Red thread was first reported in the U.S. in 1931

In overall view, corticium red thread is seen as irregularly-shaped patches of blighted turfgrass, ranging in size from two inches to three feet in diameter. In large affected areas, the patches have a generally ragged appearance due to a fairly high population of unaffected leaves.

The disease is confined to the leaves and leaf sheaths only. At the points of infection, there are small, water-soaked spots which rapidly enlarge, covering a large portion of the leaf or leaf sheath.

As these water-soaked lesions enlarge, there begins a general drying out of the affected tissue, and subsequently, a gradual fading to a tan color that eventually involves the entire leaf.

Under favorable conditions for disease development, the leaves may be completely covered with the pink gelatinous growth of the pathogen.

Field diagnosis of corticium red thread is easiest when the disease is in the final stages of development. At this time, the leaves are terminated by fine, thread-like structures, 1/16 to 1/4-inch in length that are a distinctive, bright, coral-pink color.

In recent years, another disease has been described that has many of the field diagnostic features of corticium red thread. The disease, Limonomyces pink patch, is incited by the fungus *Limonomyces roseipellis*.

It is believed only to occur on perennial ryegrass and creeping red fescue.

The main field pattern that distinguishes this disease from corticium red thread is that the coral pink tendrils at the leaf tips that are so characteristic of red thread are absent. Otherwise, many of the field diagnostic features are identical.

Limonomyces pink patch cannot be controlled with the the fungicides that are effective against corticium red thread. Thus, in cases where the reddish threads are not present, samples should be collected and sent to a laboratory for verification of which fungus species is actually inciting the disease in question.

...the primary field diagnostic features for many of the patch diseases closely resemble each other.

Optimum weather conditions for the development of corticium red thread are air temperatures in the 68-75 degrees F range, coupled with prolonged periods of rainfall.

Nitrogen fertilization has a very pronounced effect on the development of this disease. The incidence and severity of red thread is much lower when the plants are grown under high nitrogen fertilization.

Of the cultivated turfgrasses that are susceptible to corticium red thread, perennial ryegrass, creeping red fescue, and Kentucky bluegrass are most vulnerable.

With the perennial ryegrasses, the cultivars Linn and Citation are among the most resistant, while Pennfine, Omega, Manhattan, and Caprice rank with the most susceptible.

The fungicides Bayleton, Cleary 3336, Fungo 50, and Daconil 2787 are labeled for control of corticium red thread.

For optimum effectiveness, these materials should be used in conjunction with a program of nitrogen fertilization that is at the upper level of recommended pounds of available nitrogen per unit of turf area. **WT&T**

Next month, Dr. Couch examines summer patch diseases.

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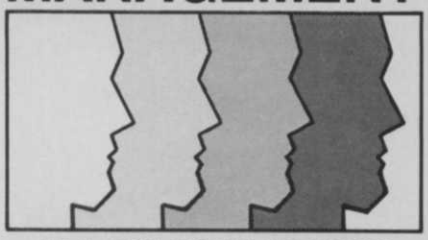
TO TRAIN OR NOT?

A booming green industry is becoming more competitive. Those who train employees may have an edge. Or do they?

by Rudd McGary and Ed Wandtke

MANAGEMENT



IN BUSINESS

The green industry is just now realizing the value of training courses.

We see trade magazine articles on the use of training systems to bring personnel into full production more quickly. Whether you are a golf course superintendent, a lawn care operator, or are working in lawn maintenance, the need for some type of systematic training becomes more and more important as market pressure in the green industry increases.

You can only maximize your personnel investment after you've properly trained your employees.

OJT training

The old style of training, still very much alive today, is called either apprenticeship or OJT (on-the-job training).

A new employee learns from an experienced one. Generally this is accomplished while doing the actual work required for the position.

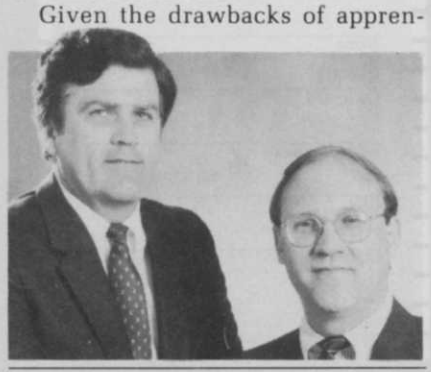
However, there are some issues to consider with this method.

First, does the person doing the training have any teaching skills? They may, but certainly they weren't hired as a teacher.

Second, is there a systematic training process that goes on during this OJT? Most often there is not.

Third, is everyone in the company aware of the particular tasks and responsibilities of their position? Usually not unless there is a central effort to educate and train.

Given the drawbacks of apprenticeship training, you should look at how to set up a training system which can be used to help train personnel more effectively. The system will help reduce employee turnover and increase the contribution of each individual to the company.



Wandtke and McGary are senior consultants with All-Green Management Associates in Columbus, Ohio. Dr. McGary focuses on marketing and management issues. Wandtke focuses on operations and financial questions.

Here are some key points in setting up a training system (warning- it may look simpler than it actually is):

1. **Define the reasons for the training**. Are you doing it to set the lowest acceptable levels of performance for the personnel? Is it to infuse new information into the organization? Is the training to raise the current level of personnel to a higher plane? Is is done to make the personnel more efficient in current positions? Why are you doing it? If you can't answer this basic question, don't bother to train. It will be expensive, and training for training's sake is a waste of effort and capital.

2. **Define the specific objectives of the training.** Each training course should have a concrete educational objective before beginning. Without an educational objective you won't know if the training is beneficial.

3. **Assess the resources available for doing the training**. You may find that you have valuable resources inside your own organization. If you don't have someone qualified to teach the course, go outside the organization. It may cost more but at least the training will be done professionally. In many cases training done by outside resources is better received than training done by in-house personnel.

4. **Determine the sequence of training**. Training for companies should be sequenced so that one course can lead to another. If you're only going to do one course a year, this isn't a problem. If you can relate everything you desire to your personnel in one course, call us. We can use someone who can do that. We can't.

5. **Determine the dates and costs of the training**. In the green industry, much of the training is done in the off-season. This is often the best time to bring all the personnel together and to have them free of outside pressures. This is particularly true if you're going to do longer two- and three-day courses. You might also consider some short courses during the season when the information given in the course is more immediately applicable.

Costs of the training involve the teaching staff, the facilities to be used, and time spent by the personnel in the course. Each of these is important in assessing the total expenditure for training.

6. **Design the materials to be used in the training**. Will you have manuals? Will the instruction be primarily verbal? Will you use audio-visual devices? Will you be doing hands-on training? Just how will the information be delivered? Answering these questions will help the instructor be effective during the presentation.

7. **Finally, you must have some sort of assessment of the training**. This is the one aspect of training that is most often overlooked. Many companies have training programs and then fail to assess their effectiveness. If you can set educational objectives you should be able to construct some means of assessing how well the participants learned the materials. Failure to do this may mean that you're simply giving courses which no one understands. That's expensive.

What type of organizations need training? All of them.

The green industry is growing, as is competition and costs.

Effective training systems will better assist in preparing personnel for their jobs and if done correctly, should be beneficial to both the participants and the company. **WT&T**

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EVENTS

APRIL

ALCA Student Field Days, April 4-6. Oklahoma State University, Stillwater, Okla. Contact Kelly Keith, OSU Dept. of Horticulture and Landscape Architecture, 360 Ag Hall, Stillwater, OK 74078.

Southern Tree Workshop, April 14-16. Cypress Gardens, Cypress Gardens, Fla. Contact Jack Siebenthaler, PO Box 6524, Clearwater, FL 33518, (813) 446-3356.

Southeastern Turfgrass Conference, April 21-22. Coastal Plain Experiment Station, Tifton, Ga. Contact Glenn W. Burton, (912) 386-3353.

Landscape Industry Show, April 23-25. Long Beach Convention Center, Long Beach, Calif. Contact Sharon McGuire, show coordinator, CLCA Headquarters, 2226 K St., Sacramento, CA 95816, (916) 448-CLCA.

National Institute on Park and Grounds Management Regional Conference, April 28-29. Reno, Nev. Contact regional conference, Box 1936, Appleton, WI 54913, (414) 733-2301.

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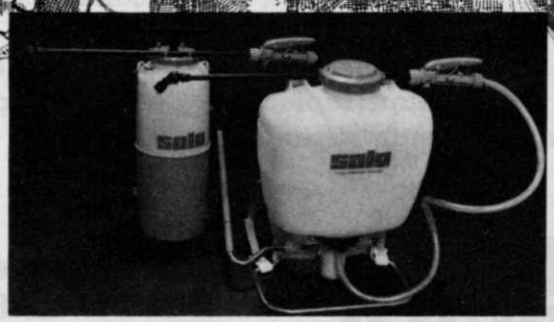

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Circle No. 165 on Reader Inquiry Card

Upside-down harrow saves time, money

Using a Fuerst harrow upside down may sound ridiculous, but one golf course superintendent is doing just that...and saving time and money in the process.

Bruce Jackman, superintendent of the Clarkston Golf and Country Club in Clarkston, Wash., uses the harrow smooth-side down to break up aerifier plugs. The process takes him less than half the time he used to spend pushing the cores off the greens by hand.

Jackman, whose greens are almost completely sand-based, cautions that the technique may not work on other types of greens. "I sure recommend it for greens like mine," Jackman says. "I don't know how it would be for soft ones or clay, but for sand greens it's super."

Jackman starts by making sure his greens aren't too wet, just wet enough that his Ryan aerifier will go to a three-inch depth with the spike. Then he lets the greens dry for 10 or 15 minutes.

The key step is to drag the harrow, smooth-side down, on the back of a golf cart. On Jackman's greens, each measuring 4,000 to 5,000 sq. ft., it takes about 10 minutes to break up the cores.

Next, Jackman explains, he uses a blower to blow away the debris. He follows this with a Lelly containing sand and a sand ring in it to spread the sand. Again, he uses the harrow and brushes to drag the sand into the holes.

"The little bit of sand the harrow doesn't get into the holes, the brushes do," Jackman says. "Within an hour or an hour and a half, I'm ready to turn the water on, and the people can play golf on them, and they'd never know they've been aerated."

Jackman estimates he saves about three man-hours per green or about 54 hours for the entire process. "We used to set aside a full week to do the 18 holes. Now, I can start Monday morning, and, if I have good weather, I'm done Tuesday night."

Jackman says it's important to remember what type of aerifier one uses. His Ryan leaves lips, so to cap them, he must drag the harrow in the opposite direction of the aerifier. With some aerifier models, the harrow can actually be pulled directly behind the aerifiers.

Jackman says his process works not only on greens, but fairways and pathways as well. "They may think I'm nuts, but I do it, and it's cheaper and it does a good job."

Aerifier plugs before dragging with an upside down Fuerst harrow.

Aerifier plugs after dragging.

PROBLEM SOLVERS

by **Balakrishna Rao**, Ph.D

Removing annual grassy weeds

Problem: *Is there any product or practice which will: 1) remove weedy grasses from a blue/ryegrass lawn once they have germinated; and 2) remove bermudagrass at any time from blue/ryegrass lawns (poa annua and crabgrass excepted)? (California)*

Solution: If you are referring to annual grassy weeds, post-emergent products like DSMA, MSMA, or Daconate-6 can be used to manage weedy grasses after they have germinated. It is best to apply these products when seedlings are very young and are at the 2-3 leaf stage of development.

Other groups of grassy weeds in lawns include perennial plants like coarse or tall fescues and quackgrass. There is no herbicide to remove these on a selective basis. Non-selective herbicides such as Roundup can be used to manage them. These non-selective herbicides will kill any green vegetation which is contacted. Therefore, be careful in areas where it will be used. After the treatment, wait for 7-10 days and prepare the soil for seeding and seed the area with desirable grass mixtures.

Although it is not impossible, it is difficult to remove bermudagrass at any time from blue/ryegrass lawns. The best practice is to use Roundup and then seed the area with desirable turfgrass mixtures. Reports indicate that bermudagrass is a difficult grass to kill with one application of Roundup.

Therefore, repeat applications will be necessary until all the bermudagrass is killed. If the plants are already producing seeds, bagging them along with the clippings while mowing will help minimize the infestation in the future. Maintain good cultural practices to favor the establishment of desirable turfgrass which would gradually minimize bermudagrass infestation later on.

Managing snow mold

Problem: *A number of our clients' lawns had snow mold disease problems in past years. What is the best way to manage these problems? (New York)*

Solution: Success in snow mold disease management depends upon proper diagnosis of the causal agents and following good management guidelines. Since we do not have a good broad-spectrum fungicide to manage all snow mold diseases, proper identification is very important when considering a fungicide treatment.

Several different fungal agents can cause turf diseases at low temperatures. Among these are pink snow mold (Fusarium patch) caused by *Fusarium nivale* and gray snow mold caused by *Typhula spp.*, which are the two most common and important snow mold diseases active during the winter months.

Pink snow mold is characterized by reddish-brown spots with pinkish colored margins. Pinkish mycelial growth may be present at the border of patches in early morning.

Gray snow mold has gray to black mycelium with hardened yellow-brown fungal bodies (sclerotia) embedded in the leaf and crown of infected plants.

Often snow mold problems can be managed successfully by following good cultural practices. Avoid producing lush growth by fertilizing in the fall. Continue mowing until turfgrass top growth stops. Manage the thatch problem if present.

Since the snow molds usually kill only the turfgrass leaves, rake and break up infected and matted leaves to encourage new tiller growth from the crown. This should be done before grass greenup in spring and prior to application of pre-emergent crabgrass herbicides.

Lawns with a history of snow mold disease severity can be treated with fungicides. General fungicide recommendations include one application before the first snow cover, the second application during mid-winter and the third application after the snow melts in the spring. Among these three applications, the one which is made in the fall before the snow cover is more beneficial and practical.

Chemical treatments in the spring—after the damage has been done—may not be very effective.

Avoiding tree wounds

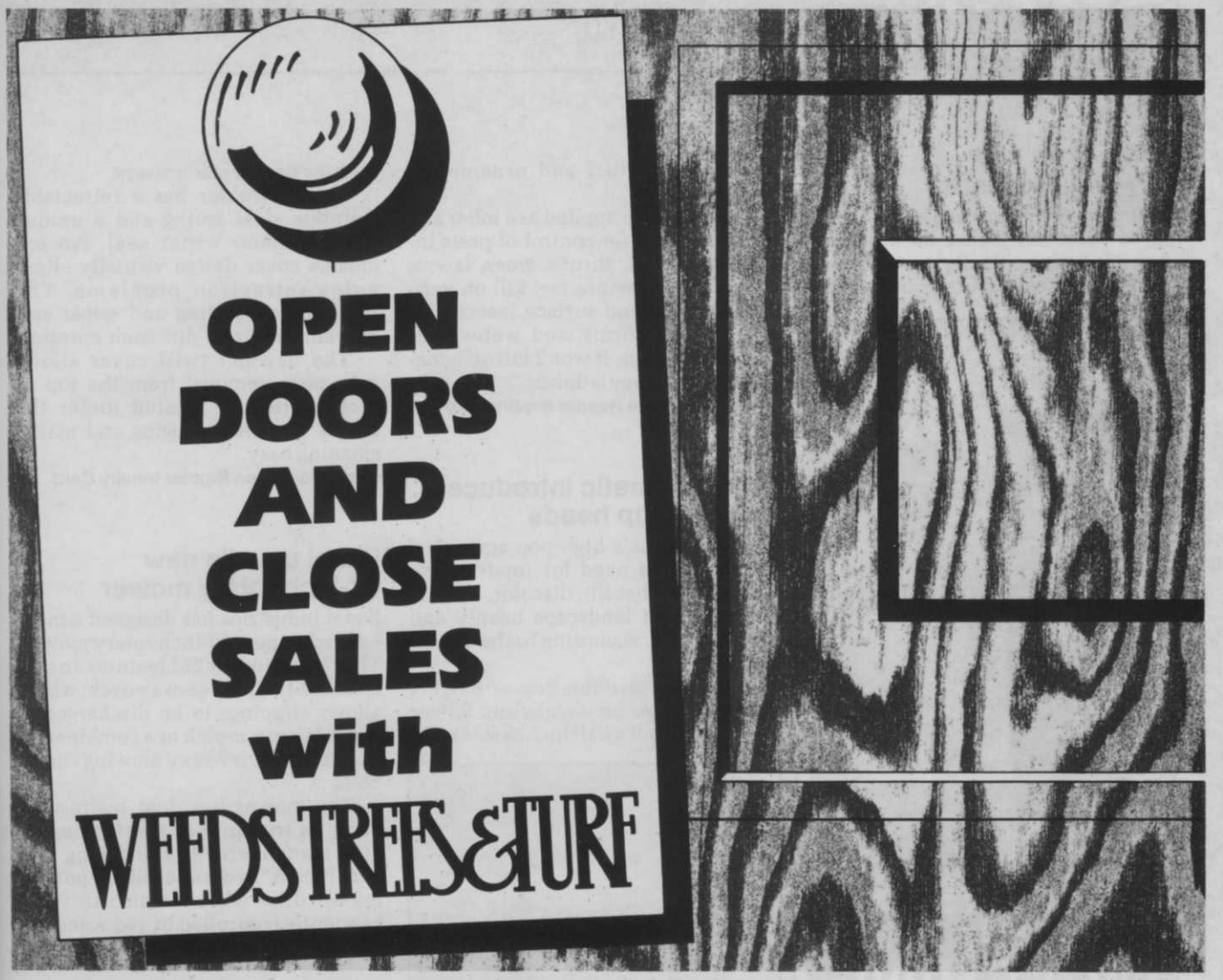
Problem: *In the past we have tried iron-container drilled holes. Is there something we can apply on tree foliage or treat through the soil for iron chlorosis without wounding the trees? (Michigan)*

Solution: Several companies market chelated forms of iron that are recommended for either foliar or soil application. Contact a horticultural supply service for products available in your area.

Based on our experience, soil applications of iron work best as preventative treatments for shade trees. We have not had consistent results with soil applications of chelated iron at recommended rates after chlorosis symptoms have developed. The leaves of some tree species do not respond to foliar treatments of iron. Therefore, we would suggest you try it on a small scale, perhaps spraying one branch.

Balakrishna Rao is Director of Lawn Care Technical Resources for The Davey Tree Co., Kent, Ohio.

Questions should be mailed to Problem Solver, Weeds Trees & Turf, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.



Attention Lawn Care Companies, Distributors, Lawn and Garden Retailers and Seed Marketers:

From your own experience, you know that when the typical homeowner looks out of a window of his 15-year-old or older home, he sees an aging, dull lawn without a single improved variety of grass in it. What he would like to see is what he's noticed on newer lawns — greener, healthier, finer-bladed grass — but he doesn't have the slighest idea of how to achieve it.

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Circle No. 170 on Reader Inquiry Card

Dylox gets new EPA registration

The EPA has approved a new registered label for Dylox 80% Soluble Powder Insecticide. Dylox, a product of Mobay Chemical Corp., is made exclusively for turf and ornamental uses.

Dylox can be applied as a foliar and soil treatment for control of pests infesting flowers, shrubs, trees, lawns, and turf. It provides fast kill on various leaf, soil and surface insects, including cutworms, sod webworms and white grubs. It won't kill off beneficial insect populations.

Circle No. 190 on Reader Inquiry Card

Weather-matic introduces high pop-up heads

Weather-matic's high-pop sprinklers eliminate the need for unattractive metal risers that tilt, discolor, and adversely affect landscape beauty and maintenance, according to the manufacturer.

The 30 series offers pop-up heights from 12-inches for shrubs and flower beds to two and a half inches for lawns and low ground cover. The sprinklers are designed for use with Weathermatic 300 series brass nozzles of specified adapters for adding specialty nozzles or extension risers.

30 Series Lawn and Shrub Sprinklers

Each sprinkler has a retractable stainless steel spring and a unique polyurethane wiper seal. An exclusive cover design virtually eliminates retraction problems. The combination seating and wiper seal prevent sand and dirt from entering.

The bayonet twist cover allows easy parts removal from the top. A plastic strainer located under the nozzle prevents clogging and makes cleaning easy.

Circle No. 191 on Reader Inquiry Card

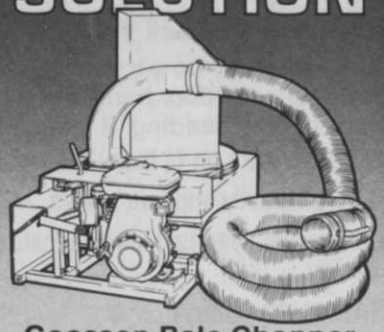
Excel unveils new 60-inch rotary mower

Excel Industries has designed a maneuverable new 60-inch rotary mower. The 18-hp Hustler 262 features an outfront, 60-inch, three-way deck, which allows clippings to be discharged to the side, rear, mulch or a combination of side/rear for heavy mowing conditions.

The mower has dual hydrostatic drive for true zero-degree turning radius maneuverability and long system life. A hydraulic pump powers the two drive wheels, which are independently controlled by twin steering levers. This exclusive direct drive

EXCEL HUSTLER 262

THE MULCHING SOLUTION



Goossen Bale Chopper

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system eliminates the need for high maintenance.

Attachments for the 262 include a 16-bushel Bac-Vac grass vacuum, a 60-inch dozer blade and coulter-type edger. The 262 can be used commercially or for estates, contract applications, and farms.

Circle No. 192 on Reader Inquiry Card

Jake expands reel mowers with new triplex model

Jacobsen has designed a lightweight triplex mower for precise grooming of formal and semi-formal turf.

The TF-60 features five hydraulically-powered blade reels which cut a 62-inch swath at heights from 1/4 to 3/4 inch.

The TF-60 can be used on golf course collars, tees, and fairways where a close height is required.

The hydraulic traction drive allows for varying cutting frequency to match both height and type of turf. Reels are reversible to permit back-

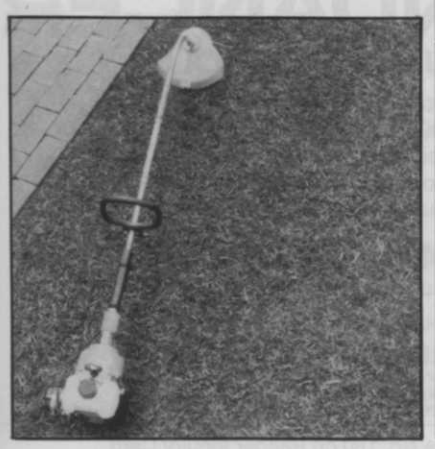
lapping in place.

The triplex has an eight gallon fuel tank. The interchangeable grass catchers are standard.

Circle No. 193 on Reader Inquiry Card.

Stihl trimmer smallest in line

The Stihl FS-51 AVE trimmer takes care of those small, but important jobs.



At 11 pounds, two ounces, the trimmer is the smallest on the Stihl product line. Its lightweight design makes it perfect for lawn edging, cutting around trees and bushes, and along walls and fences.

The trimmer utilizes an electronic ignition system for easy starting. Other features include an adjustable loop handle and centrifugal clutch.

Accessories available for the FS-51 are nylon line heads, auto-cut line head and rotocut blades.

Circle No. 194 on Reader Inquiry Card.

EIS EDITORIAL INFORMATION SERVICES

If you are interested in obtaining any available or additional editorial research or reference materials published in this or previous issues, direct inquiries to Kathleen Maciuszko at (216) 826-2839, ext. 839.

This Head Could Put You To Sleep

The cool, calm hours of the evening and early morning are ideal for irrigation. But the noise of an old-fashioned impact sprinkler is about as conducive to a good night's sleep as a couple of cats on the roof.

The resulting customer complaints about noise have been a tough problem to solve. Until now.

Hunter's silent-running sprinklers are designed for quiet operation at any hour of the day or night. They're gear-driven for a soft, even, rain-like application of water.

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Circle No. 123 on Reader Inquiry Card

Union Carbide develops Weedone amine herbicide

Union Carbide Agricultural Products Co. has developed an amine formulation of broadleaf weed herbicide for turf management professionals.

Weedone brand DPC Amine herbicide can be used in routine spray applications. It is a non-volatile amine salt formulation.

Weedone containes the weed-killing power of 2,4-D and dichlorprop. It kills most weeds, including oxalis, spurges, ground ivy, and violets, but won't injure adjacent vegetation or leave a lasting residue in the soil.

The herbicide can be used on residential lawns, golf courses, athletic fields, and parks.

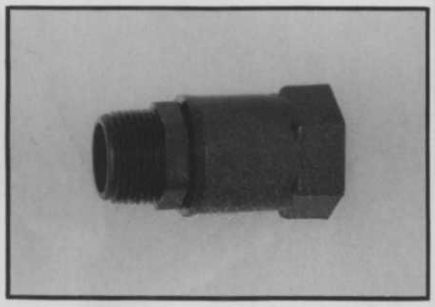
Weedone can be applied at any time of the year. Tank mixtures with fertilizers are possible for economical "weed and feed" treatments.

Circle No. 195 on Reader Inquiry Card

Stop head thieves with King Head-Lok

It's easy to steal valuable sprinkler heads. Thieves know it but now you can prevent theft with the Head-Lok, developed by King Bros. Industries.

Head-Lok is a PVC fitting which is placed between the riser and sprinkler head below ground. When someone tries to remove the head, a swiveling action prevents the removal without extensive digging.



Head-Lok is available in 1/2-inch, 3/4-inch, and one-inch sizes.

Circle No. 196 on Reader Inquiry Card

Rear mount tiller allows close planting

The Roto-Hoe Co. has designed a new power unit/rear mount tiller that allows for planting rows closer together. The tiller is 16 1/2-inches wide, making it easier to plant rows close together.

The model 910 is available with a 4 or 5 hp Briggs & Stratton engine. It also has five forward speeds, ranging from .35 mph to 1.75 mph.

Roto-Hoe manufactures the tiller's

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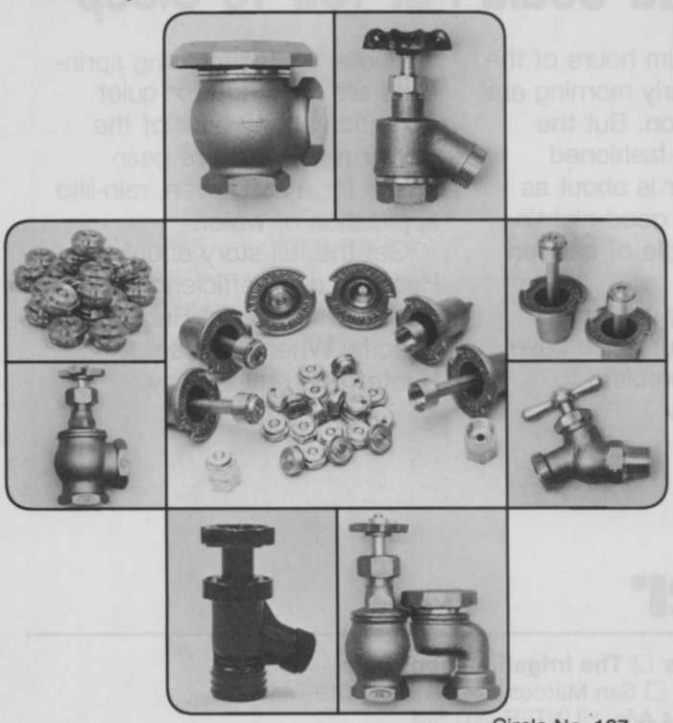

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Circle No. 160 on Reader Inquiry Card

semi-pneumatic, tractor tread tires. A variety of attachments can be used with the 910 including a shredder, snow thrower, water pump and tillage tools.

Circle No. 197 on Reader Inquiry Card

Greensmower available for field tests

Lesco is offering its new greensmower for field tests. The company has scheduled the Greensmower for full release this year.

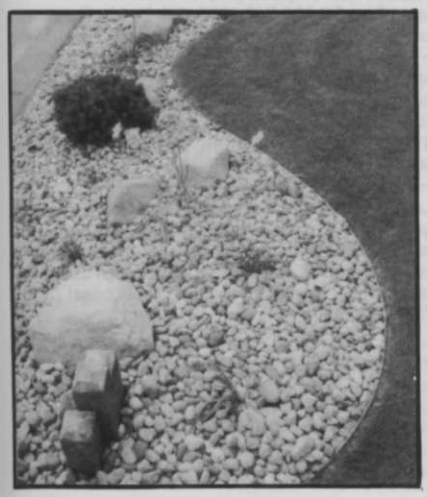
The Greensmower has hydraulic power steering for easier maneuvering with no cables. It also features independent reel controls for multiple mowing patterns and reversible hydraulics to allow backlapping of individual units while the operator remains on the machine.

The Greensmower has an 18 horsepower, twin-cylinder Kohler Magnum engine and is designed for easy servicing. For example, it isn't necessary to remove the valve blank to access the valve spools. Also, the pump removes easily through use of "flex" coupling. The Greensmower has jacking pads for easy frame repairs.

Circle No. 198 on Reader Inquiry Card.

Aluminum edging is alternative to steel

Permaloc is marketing ⅛-inch and 3/16-inch aluminum edging. The edging can be used as a landscape border for plantings and sand-set brick pavers.



The aluminum edging won't rust like steel edging. It resists most salts and fertilizers, which cause rusting.

The edging saves on labor costs since it is easier to install than steel. The aluminum is designed to stay in the ground. Because it is three times lighter than steel, it is less costly to ship and easier to handle during installation.

Circle No. 199 on Reader Inquiry Card.

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Next month in

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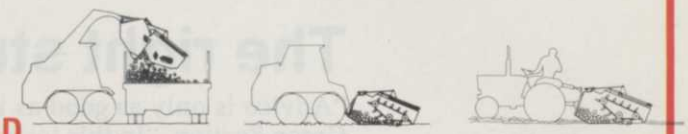

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The right stuff

"Advice is only as good as its source," says William Bengeyfield of the USGA Green Section. "In this technical age, two heads are better than one." He refers, of course, to the services offered by his group. But he could just as well be referring to the general dissemination of knowledge within the entire green industry.

Once upon a time, landscape managers could keep clients happy enough simply by demonstrating a general knowledge of living things and having a sixth sense.

But the industry has evolved long past that stage. Nowadays, landscape managers have to be well educated in the classroom and well trained in the field to survive in this very competitive marketplace.

Indeed, Dr. Fred Grau of the Musser International Turfgrass Foundation took a few moments recently to marvel at the industry's increasing sohistication. "I can't get over the facilities you have to create beautiful, safe turf today," he said during a session at the GCSAA convention. "The equipment and chemicals are so much improved over the equipment and chemicals of 10 and 20 years ago."

It is up to the individual landscape manager to keep abreast of the times, and the ones who do so will be those who prosper.

Bengeyfield tells a parable about a broken machine.

The machine's owner called on a consultant to fix the unit. The consultant removed his trusty hammer, gave the machine a whack and—lo and behold—it started up with no problem. The consultant then told the owner that his fee was $1,000. The owner, reluctant to pay such an exhorbitant price, said that he could've hit the machine just as easily himself.

"I charge $100 for hitting the machine," replied the consultant. "The other $900 is my fee for knowing ***where*** to hit it."

Okay, so maybe you're not in the consulting business. But such is the value of education and training. The astute turfgrass and landscape manager would thus be advised to heed the moral of Mr. Bengeyfield's story.

Jerry Roche

Jerry Roche, editor

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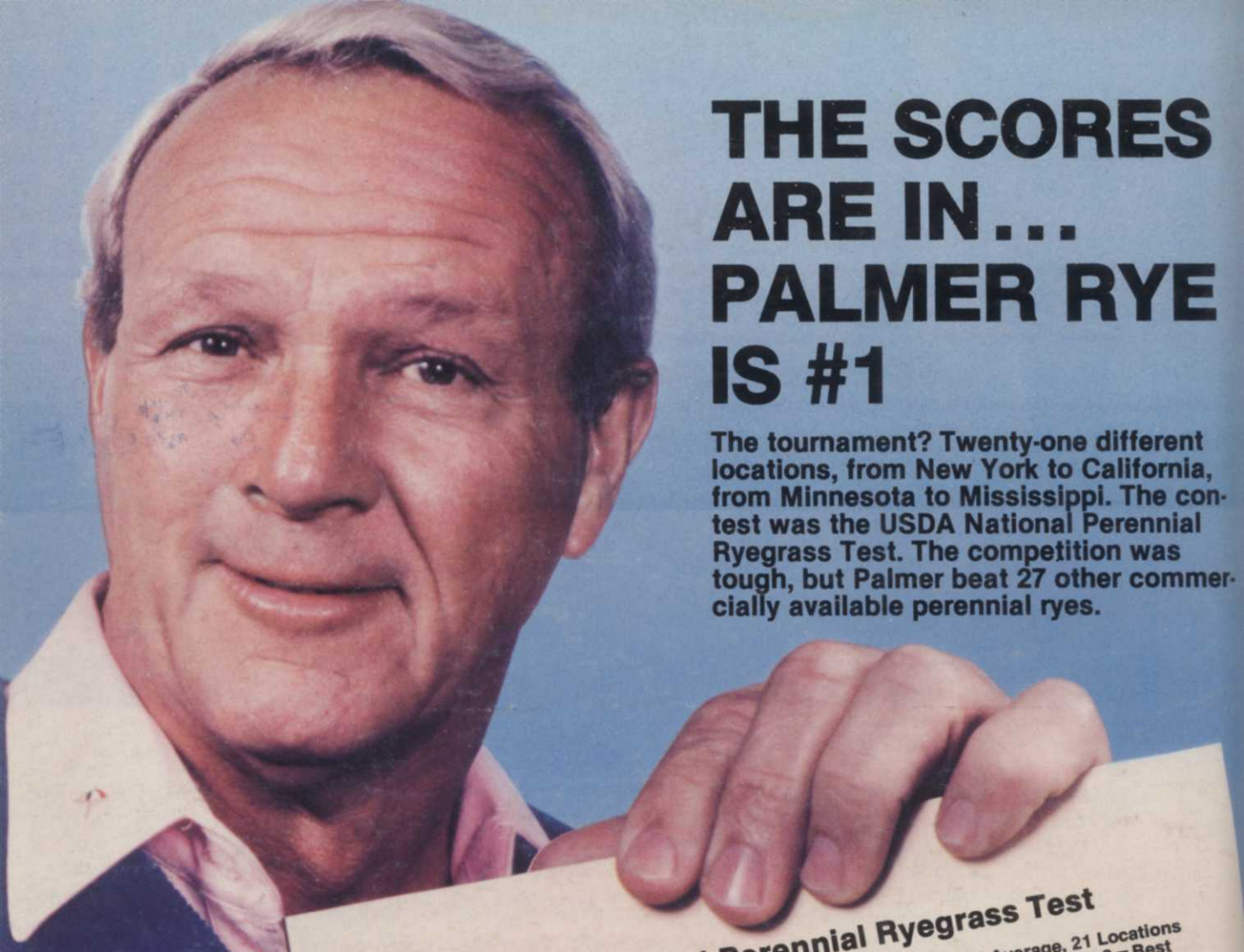

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Ranger	5.6
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Variety	1984 Average, 21 Locations Turf Quality 1-9; 9 = Best
Derby	5.5
Cowboy	5.4
Dasher	5.4
Diplomat	5.3
Ovation	5.3
Pennfine	5.3
Regal	5.3
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